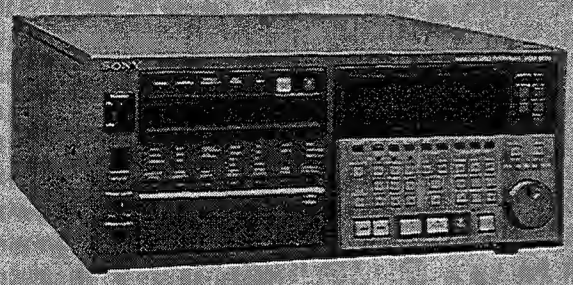
SONY

DIGITAL MASTER DISC RECORDER

PCM-9000

REMOTE CONTROLLER

RM-D9000



DABK-9001 DABK-9002 DABK-9003 DABK-9004
DABK-9005 DABK-9006 DABK-9007

OPERATION MANUAL English
1st Edition
Serial No. 10001 and Higher

For the customers in the U.S.A.
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

For the customers in Canada
This apparatus complies with the Class A limits for radio noise emissions set out in Radio Interference Regulations.

Pour les utilisateurs au Canada
Cet appareil est conforme aux normes Classe A pour bruits radioélectriques, spécifiés dans le Règlement sur le brouillage radioélectrique.

WARNING

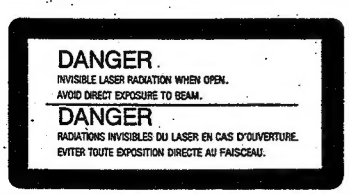
To prevent fire or shock hazard, do not expose the unit to rain or moisture.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: Using this unit at a voltage other than 120 V may require the use of a different line cord or attachment plug, or both. To reduce the risk of fire or electric shock, refer servicing to qualified service personnel.

CAUTION

As the laser beam used in this Master Disc Recorder is harmful to the eyes, do not attempt to disassemble the cabinet. Refer servicing to qualified personnel only.



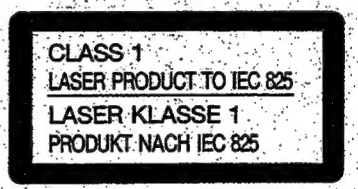
This label is located on the top of the unit.

Bescheinigung des Herstellers
Hiermit wird bescheinigt, daß Master Disc Recorder PCM-9000 in Übereinstimmung mit den Bestimmungen der BMPT-Amtsblatt Vfg 243/1991 und Vfg 46/1992 funkentstört ist. Der vorschriftsmäßige Betrieb mancher Geräte (z.B. Meßsender) kann allerdings gewissen Einschränkungen unterliegen. Beachten Sie deshalb die Hinweise in der Bedienungsanleitung. Dem Bundesamt für Zulassungen in der Telekommunikation wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf die Einhaltung der Bestimmungen eingeräumt.

Sony Deutschland GmbH
Hugo Eckener Str.20
D-5000 Köln 30

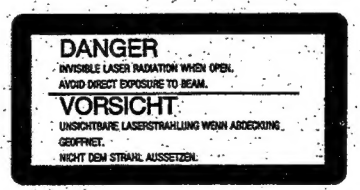
Hinweis
Gemäß der Amtsblätter des BMPT Nrn. 61/1991 und 6/1992 wird der Betreiber darauf aufmerksam gemacht, daß die von ihm mit diesem Gerät zusammengestellte Anlage auch den technischen Bestimmungen dieser Amtsblätter genügen muß.

For the customers in the Europe

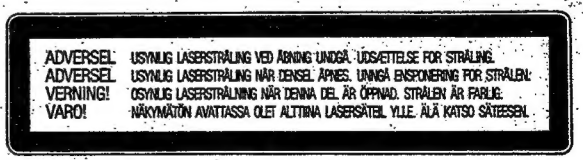


This Master Recorder is classified as a CLASS 1 LASER PRODUCT.
The CLASS 1 LASER PRODUCT label is located on the rear panel of the recorder.

Bei diesem Master-Recorder handelt es sich um ein Gerät der Laser-Klasse 1. An der Rückseite des Gerätes befindet sich ein Aufkleber mit der Beschriftung LASER KLASSE 1 PRODUKT.



Dieser Aufkleber befindet sich oben am Gerät.



This label is located on the top of the unit.

Laser Diode Properties

Material	GaAlAs
Wave length	785 nm
Emission duration	Continuous
Laser output power	35 mW (max)
Beam divergence	(H) 12±1.5°
	(V) 24 $^{+4.5°}_{-4°}$

Daten der Laserdiode

Material	GaAlAs
Wellenlänge	785 nm
Emissionsdaver	Kontinuierlich
Laser-Ausgangsleistung	35 mW (max.)
Strahldivergenz	(H) 12° ±1,5°
	(V) 24° $^{+4.5°}_{-4°}$

Laserdiode data

Materiale	GaAlAs
Bølgelængde	785 nm
Strålingsvarighed	Kontinuerlig
Lasereffekt	35 mW (max.)
Strålens divergens	(H) 12±1.5°
	(V) 24 $^{+4.5°}_{-4°}$

Laserdiodens egenskaper

Material	GaAlAs
Våglängd	785 nm
Strålningstid	utan avbrott
Laseruteffekt	35 mW (maxvärde)
Strålens divergens	(H) 12±1.5°
	(V) 24 $^{+4.5°}_{-4°}$

Laserdiodens egenskaper

Materiale	GaAlAs
Bølgelengde	785 nm
Emisjonslengde	Kontinuerlig
Laser utgangseffekt	35 mW (maks.)
Stråledivergens	(H) 12±1.5°
	(V) 24 $^{+4.5°}_{-4°}$

LUOKAN 1 LASERLAITE

VAROITUS!
Laitteen käyttäminen muulla kuin tässä käyttöohjeessa maintulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

KLASS 1 LASER APPARAT

VARNING!
Om apparaten används på annat sätt an i denna bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass. 1.

Table of Contents

Table of Contents

About This Manual

Purpose and audience

This manual is provided as the Operation Manual for the PCM-9000 Digital Master Disc Recorder. It contains the information you need to operate the PCM-9000, the RM-D9000 Remote Controller, and their peripherals.
The manual is aimed at professional operators in production companies, recording studios or broadcasting stations. It is assumed that the user has experience of using digital audio recorders.

Organization

This manual is divided into the following eight chapters and appendixes.

Chapter 1 Overview

Introduces the PCM-9000 features and optional equipment.

Chapter 2 Location and Function of Parts and Controls

Gives the names and functions of the controls and other parts.

Chapter 3 Preparations

Describes the basic connections, settings and disc handling, which you need to know before operating the PCM-9000.

Chapter 4 Basic Operations

Describes basic operations such as recording, playback, and search. It also explains operation modes, one of the main features of the PCM-9000.

Chapter 5 Program Editing

Describes program editing, performed in units of tracks and files.

Chapter 6 Time Code Chase

Explains synchronized operation with the time code chase function.

Chapter 7 Disc Maintenance

Describes the disc check and optimize functions, and the deletion of the contents of the disc.

About This Manual

Chapter 8 Advanced System Configurations

Gives a variety of system configurations based on the PCM-9000.

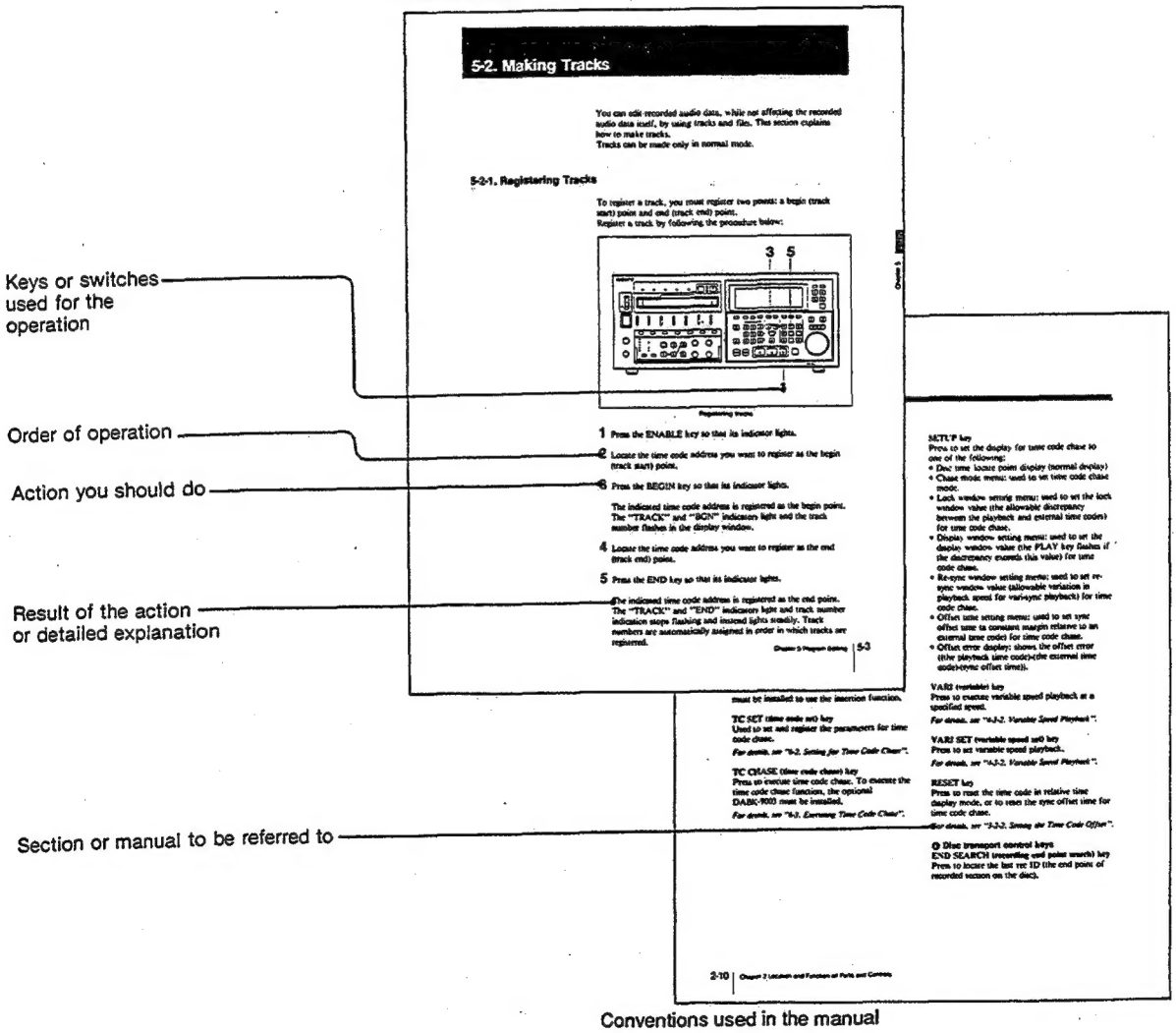
Appendixes

Include the following:

- Specifications
- Glossary

Conventions used

This manual uses the conventions shown below.



Conventions used in the manual

Reference

The following manuals are supplied with the PCM-9000. Refer to them as necessary.

Maintenance Manual

Provides the technical information necessary for installing and maintaining the PCM-9000 and its peripherals.

Chapter 1 Overview

This chapter introduces the features of the PCM-9000 and optional equipment. Read this chapter to help you make the best use of the PCM-9000.

1-1. Features of the PCM-9000

The PCM-9000 Digital Master Disc Recorder is a 2-channel digital audio recorder, which uses a magneto-optical (MO) disc as its external storage device. The PCM-9000 system is composed of the master disc recorder unit and the RM-D9000 Remote Controller.
The use of MO discs allows the PCM-9000 to provide quick and easy operation. In addition, you can configure versatile systems with a variety of features such as program edit, automatic punch in/out, record/monitor channel setting, variable speed playback, time code chase, and digital copy through a SCSI (Small Computer System Interface).

Optional equipment

RM-D9000 Remote Controller
Enables the remote control of the PCM-9000. Many of the PCM-9000's functions, including program edit, can be accessed via the remote controller.

DABK-9001 Converter Board
Converts an analog input signal into a 20-bit digital signal, or a 20-bit digital signal into an analog output signal.

DABK-9003 Interface Board
Enables the PCM-9000 to input/output external time codes, parallel remote signals and 9-pin remote control signals. This board is necessary to record an external time code onto the time code channel.

DABK-9004 Digital I/O Board
Adds SDIF-2 format digital audio input and output connectors, each having two channels, to the PCM-9000.

DABK-9005 Interface Board
Adds SCSI connectors. The PCM-9000 can be controlled from an external editor or computer through the SCSI. This board is necessary to perform double-speed digital copy between two PCM-9000 units.

DABK-9006 Interface Board
Enables the PCM-9000 to be connected to the DAQ-1000 Cue Editor. This lets you make master discs onto which cue signals have been recorded.

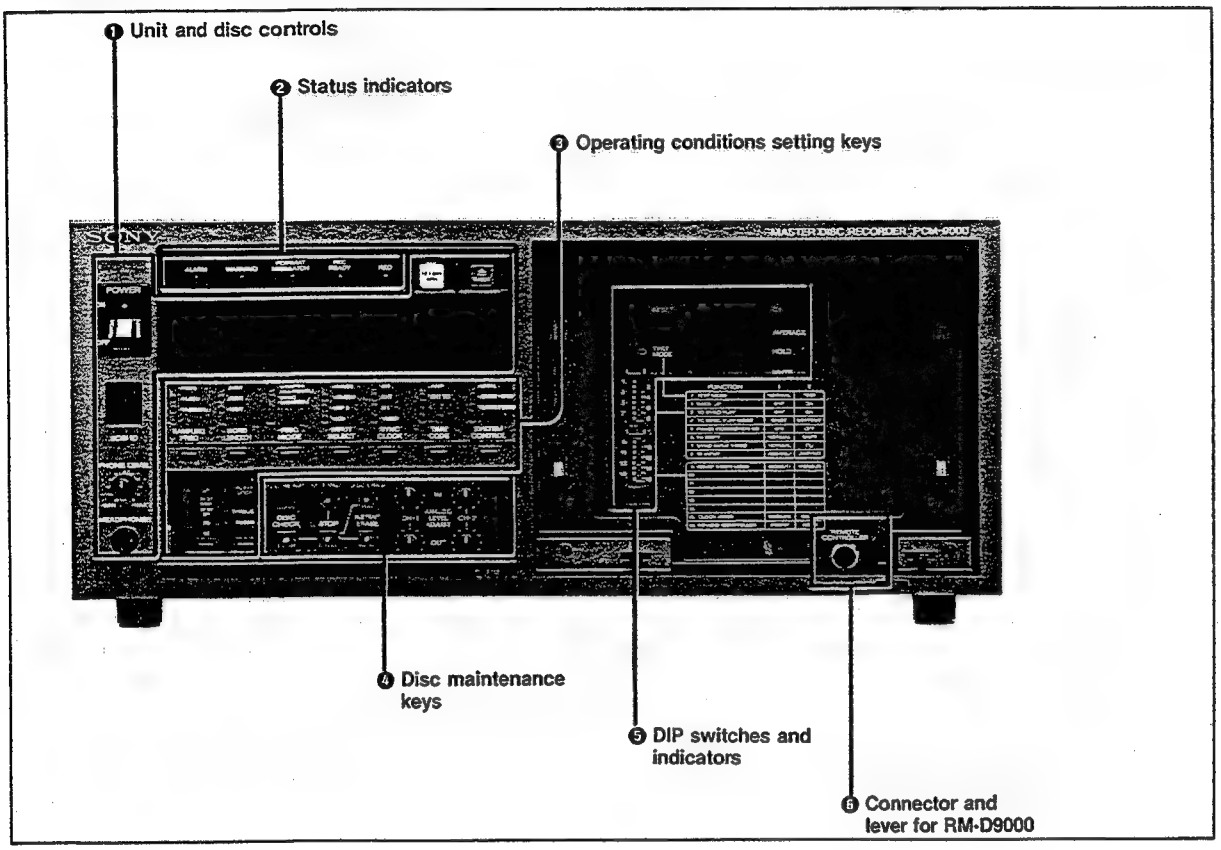
DABK-9007 Memory Board
Adds a jog monitor with uninterrupted sound, and an optimizing function.

Chapter 2
Location and Function of Parts and Controls

This chapter briefly describes the functions and purposes of the principal controls and connectors. Read this chapter before moving on to the operating procedures, covered in chapter 3 and subsequent chapters.

2-1. PCM-9000

2-1-1. PCM-9000 ControlPanel



PCM-9000 Controle panel

(1) Unit and disc controls

EDIT DATA SAVE key
Press to save edit data in memory to the loaded disc.*For details,see"5-5.Saving the Edit Data"*

EJECT key
Press to eject the disc.

POWER switch
Turns the power on and off.

SCSI ID indicator
Shows the ID number of this unit, as set with the ADDRESS switch on the optional DABK-9005.

PHONE LEVEL (headphones level) control
Adjusts the volume level of the headphones

HEADPHONES (headphones) connector
Used to connect a set of stereo headphones for monitoring the output sound.

(2) Status indicators

ALARM indicator
Lights if the PCM-9000 suffers a fault.

WARNING indicator
Lights if a misoperation is detected.

FORMAT MISMATCH indicator
Lights under the following conditions as follows:

- When copying, the sampling frequency and word length settings of the master and slave units differ.

REC READY (recording ready) indicator
Lights when the REC PROTECT switch on the loaded disc is set to the recording enable position, provided the unit is set to recording ready status.

REC (recording) indicator
Lights while recording to a disc.

(3) Operating condition setting keys

SAMPLING FREQ (frequency) key
Press to select a recording sampling frequency to be used by the unit. For playback, the sampling frequency of the data on the disc is followed. One of the following indicators lights, according to your selection.

- 48 kHz: the sampling frequency is set to 48 kHz
- 44.1 kHz: the sampling frequency is set to 44.1 kHz
- 44.056 kHz: the sampling frequency is set to 44.056 kHz

Setting DIP switch number 6 on the PCM-9000 to II (Fs-shift mode) allows you to shift the 48KHz sampling frequency down in units of 0.1%. The corresponding indicator flashes when using the sampling frequency shift function.

Note

- For details of the Fs-shift mode, refer servicing to a Sony system engineer
- You select only 1 Fs for 1 disc.Therefore,all recordings made to a given disc must be of the same Fs.

WORD LENGTH key
Press to select the quantization word length for recording. For playback, the word length of the data on the disc is followed. One of the following indicators lights, according to your selection.

- 24 BIT: word length is 24 bits
- 20 BIT: word length is 20 bits
- 16 BIT: word length is 16 bits

Note

- You can set the word length regardless of the word length set for to the installed converter board.
- You can select only 1 word length for 1 disc

REC MODE (recording mode) key
Press to set the recording mode to either monitor or sync. One of the following indicators lights, according to your selection.

- MONITOR: Audio channels 1 and 2, as well as the time code channel, are all used for recording or playback. When recording, the sampling frequency and word length correspond to those set with the PCM-9000. Recording or playback with a the disc recorded using the same format setting is also possible.
- SYNC: Audio channels 1 and 2, as well as the time code channel , can be used independently while playing back a previously recorded signal. The sampling frequency and word length settings follow those of the previously recorded material.

INPUT SELECT key
Press to select the input audio signal. One of the following indicators lights, according to your selection.

- ANALOG: analog audio signal (the optional DABK-9001 Converter Board must be installed.)
- AES/EBU: AES/EBU format digital audio signal
- SDIF 2: SDIF-2 format digital audio signal (the optional DABK-9004 Digital I/O Board must be installed.)
- SCSI: SCSI format digital audio signal (the optional DABK-9005 Interface Board must be installed.)

Note

- If you try to select a format for which the required options are not installed, the corresponding indicator will not light.
- When you select AES/EBU or SDIF-2, the corresponding indicator flashes if the required signal is not supplied to the PCM-9000.

SYNC CLOCK key
Press to select the reference signal to be used to synchronize the PCM-9000. One of the following indicators lights, according to your selection.
- INT: internal master clock
- EXT: word sync signal input to the WORD SYNC INPUT connector
- D-I: digital signal input to the D-I SYNC connector or AES/EBU D-IO connector.
- VIDEO: video signal input to the REFERENCE VIDEO INPUT connector

Note
The corresponding indicator flashes and INT indicator illuminates if the required signal is not supplied to the PCM-9000.

TIME CODE key
Press to select the time code to be used for search. One of the following indicators lights, according to your selection.
- AAIP: time code converted from the address that is pre-grooved on a disc (AAIP—Absolute Address In Pre-groove). When using this time code, you need not record an external time code.
- EXT TC: external time code, input to the unit, and recorded to the time code channel. To use this time code, an external time code must be recorded onto the disc (the optional DABK-9003 must be installed).

SYSTEM CONTROL key
Press to select the unit to be used to control the PCM-9000. One of the following indicators lights, according to your selection.
- LOCAL: any unit connected to the PCM-9000
- REMOTE 1 (9 PIN): the unit connected to the REMOTE (9PIN) connector on the rear of the PCM-9000 (the optional DABK-9003 must be installed)
- REMOTE 2 (SCSI): an editor or computer connected to the SCSI connector (the optional DABK-9005 must be installed)

FORMAT (time code format) key
When you select AAIP,the format of the time code display on RM-D9000 and output time code can be selected by pressing this key. One of the following indicators lights, according to your selection.
- 30: 30 frames/second, non-drop frame mode (NTSC)
- 29.97 NDF: 29.97 frames/second, non-drop frame mode (NTSC)
- 29.97 DF: 29.97 frames/second, drop frame mode (NTSC)
- 25: 25 frames/second (PAL)
- 24: 24 frames/second (film)

Notes
- You cannot convert from the selected time code format to another.
- The corresponding indicator flashes if the selected format differs from that of the input or playback time code.

GEN MODE (generator mode) key
Press to select the operating mode of the internal time code generator. One of the following indicators lights, according to your selection.
- THROUGH: the input time code is recorded as is
- REGEN: the input time code is regenerated before being used

SLAVE LOCK indicator
Lights while the time code format and signal phase of the internal time code generator and external time code match during regenerating.

(4) Disc maintenance keys
REC READY (recording ready) key
Press to set three channels (audio channels 1 and 2, and the time code channel) to recording ready status.

STOP key
Press to stop the disc transport. After 3 minutes in the STOP condition, the key starts blinking. If you want to continue the operetion, press STOP key.

DISC CHECK key
While holding down the STOP key, press this key to activate the disc check function.
For details, see "7-1. Checking a Disc".

OPTIMIZE key
While holding down the STOP key(in recording ready status), press this key to activate the optimizing function. This deletes any unnecessary data from the disc to optimize the use of the disc space.
For details, see "7-2-1. Deleting Unnecessary Data — Optimizing Function".

DISC ERASE key
While holding down the STOP key (in recording ready status), press this key to delete all data on the disc. Deleting all data on a disc takes about 20 minutes.
For details, see "7-2-3. Full Erasing".

INSTANT ERASE key
While holding down the STOP key (in recording ready status), press this key to delete disc all management data (rec IDs, BEGINs, ENDs and so on).
For details, see "7-2-2. Instant Erase".

Note
After using this function, any audio signals recorded to the main data area of a disc cannot be played back, as all rec IDs will have been erased.

ANALOG LEVEL ADJUST controls
Control the levels of analog input and output signals. Channels 1 and 2 can be adjusted independently within a range of ±2 dB.
For details, see "4-2-3. Adjusting Input/Output Signal Levels".

Switch number	Function	Set to I	Set to II
1	Test mode	Normal mode	Test mode
2	Memory backup function[1)]	Disabled	Enabled
3	TC sync playback	Disabled	Enabled
4	TC sync playback mode	ONCE	CONTINUE
5	Phase correction bit function	Enabled	Disabled
6	Sampling frequency shift function	Disabled	Enabled (0.1% shift down)
7	Video input signal	Video signal	Clock pulse
8	Reference signal	Sync component in the AES/EBUsignal being input	Refference D-I sync signal being input
9	Parallel remote	Mode(1)	Mode(2)
10 - 14	For future use	———	———
15	Clock Mode	Normal	Sharp
16	Conector for RM-D9000	PCM-9000 front panel	PCM-9000 connector panel

Factory setting: All switches set to I

1) When the memory backup function is enabled, the following settings are held for three days.
- Basic settings (recording mode and input signal,variable speed value,Fs,word length)
- Time code settings (format, generator mode)
- Offset value (AAIP and time code chase offset and parameters)

2)When the clock mode switch is set to SHARP , variable speed and Time Code Sync Play cannot be performed.

3)TEST MODE can be set in the power off condition only. When you back to normal mode.Normal mode can be also set in the power off condition only.

RESET button
Press to reset the PCM-9000 to its power-on status. Any unsaved edit data in the PCM-9000's RAM (Random Access Memory) will be lost.

TEST MODE switch
Select the test mode to check the performance of the PCM-9000. This switch is activated when DIP switch 1 is set to II(test mode).

C1 indicator
Lights when the PCM-9000 detects a C1 error in the playback signal during playback and the error cannot be corrected by C1 correction. In this case, the unit automatically applies C2 correction to correct the error.

AVERAGE indicator
Lights when error correction cannot be applied to the playback signal, and the signal has been interpolated.

HOLD indicator
Lights when error correction cannot be applied to the playback signal, and the signal has been held, that is, the last value is repeated.

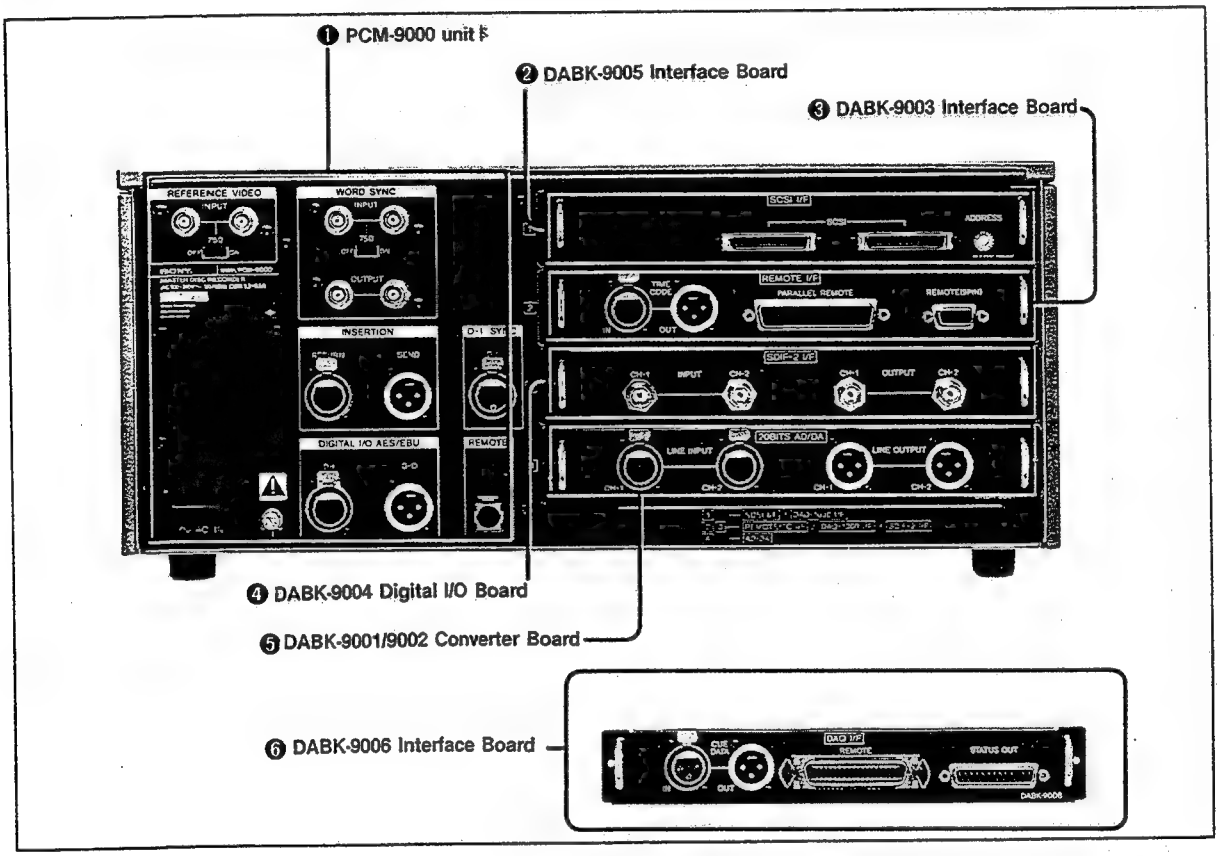
MUTE indicator
Lights when error correction cannot be applied to the playback signal, and the signal has been muted.

(6) Connector and release lever for RM-D9000

REMOTE CONTROLLER connector (Round type 10 pin)
Used to connect the PCM-9000 to the RM-D9000, using the supplied cable.When the RM-D9000 is connected to this connector,the dip switch No.16must be set to I

RELEASE lever
Move to the right to detach the RM-D9000 from the PCM-9000.

2-1-2. PCM-9000 Connector Panel



PCM-9000 connector panel

(1) PCM-9000 unit

REFERENCE VIDEO INPUT connectors (BNC type) and 75-ohm termination switch
Input the reference video signal to one of the two connectors. When outputting the input signal through the other connector, set the 75-ohm termination switch to OFF. Otherwise, set it to ON.

AC IN connector
Connect to an AC outlet using the supplied power cord.

⏚ (ground) terminal

WORD SYNC INPUT connectors (BNC type) and 75-ohm termination switch
Input the word sync signal for synchronization reference to one of the two connectors. When outputting the input signal through the other connector, set the 75-ohm termination switch to OFF. Otherwise, set it to ON.

WORD SYNC OUTPUT connector (BNC type)
Outputs the word sync signal.

INSERTION RETURN connector (XLR-3-31)
When using the insertion function, this connector is used to input the AES/EBU format digital audio signal that is output from the INSERTION SEND connector for processing by an external effecter.

2-1. PCM-9000

INSERTION SEND connector (XLR-3-32)
When using the insertion function, this connector is used to output the AES/EBU digital audio signal to be processed.

D-I SYNC connector (XLR-3-31)
Inputs the D-I signal used for synchronization reference.

DIGITAL I/O AES/EBU D-I connector (XLR-3-31)
Inputs an AES/EBU-format 2-channel digital audio signal.

DIGITAL I/O AES/EBU D-O connector (XLR-3-32)
Outputs an AES/EBU-format 2-channel digital audio signal.

REMOTE connector (Round type 10-pin)
Connects the PCM-9000 to the RM-D9000 when it is detached from the PCM-9000 front panel. Set DIP switch 16 on the PCM-9000 to II when connecting the RM-D9000 to this connector.

(2) DABK-9005 (Optional):Install this board in slot 1.
SCSI connectors (50-pin)
Input and output SCSI-format signals.

ADDRESS switch
Used to set the SCSI ID. The SCSI ID is displayed in the SCSI ID indicator.

Note
Do not set the same SCSI ID for different PCM-9000s connected through the SCSI interface. Doing so would cause a malfunction.

(3) DABK-9003 (Optional):Install this board in slot 2 or 3.
TIME CODE IN connector (XLR-3-31)
Inputs SMPTE/EBU-format time code signals.

TIME CODE OUT connector (XLR-3-32)
Outputs SMPTE/EBU-format time code signals.

PARALLEL REMOTE connector (D-sub 50-pin)
Used when controlling the PCM-9000 with 50-pin parallel remote control signals.

REMOTE (9PIN) connector (D-sub 9-pin)
Used when controlling the PCM-9000 with 9-pin remote control signals. Use this connector to connect the DAE-3000 digital audio editor. This connector can output RS-232C format signals.
For details of how to output RS-232C format signals, see the maintenance manual.

(4) DABK-9004 (Optional):Install this board in slot 2 or 3.
INPUT CH-1 and CH-2 connectors (BNC type)
Input SDIF-2 format digital audio signal channels 1 and 2.

OUTPUT CH-1 and CH-2 connectors (BNC type)
Output SDIF-2 format digital audio signal channels 1 and 2.

(5) DABK-9001 (Optional):Install one of these board in slot 4.
LINE INPUT CH-1 and CH-2 connectors (XLR-3-31)
Input analog audio signal channels 1 and 2.

LINE OUTPUT CH-1 and CH-2 connectors (XLR-3-32)
Output analog audio signal channels 1 and 2.

(6) DABK-9006 (Optional):Install this board in slot 1, 2, or 3.
CUE DATA IN connector (XLR-3-31)
Inputs cue data from the DAQ-1000.

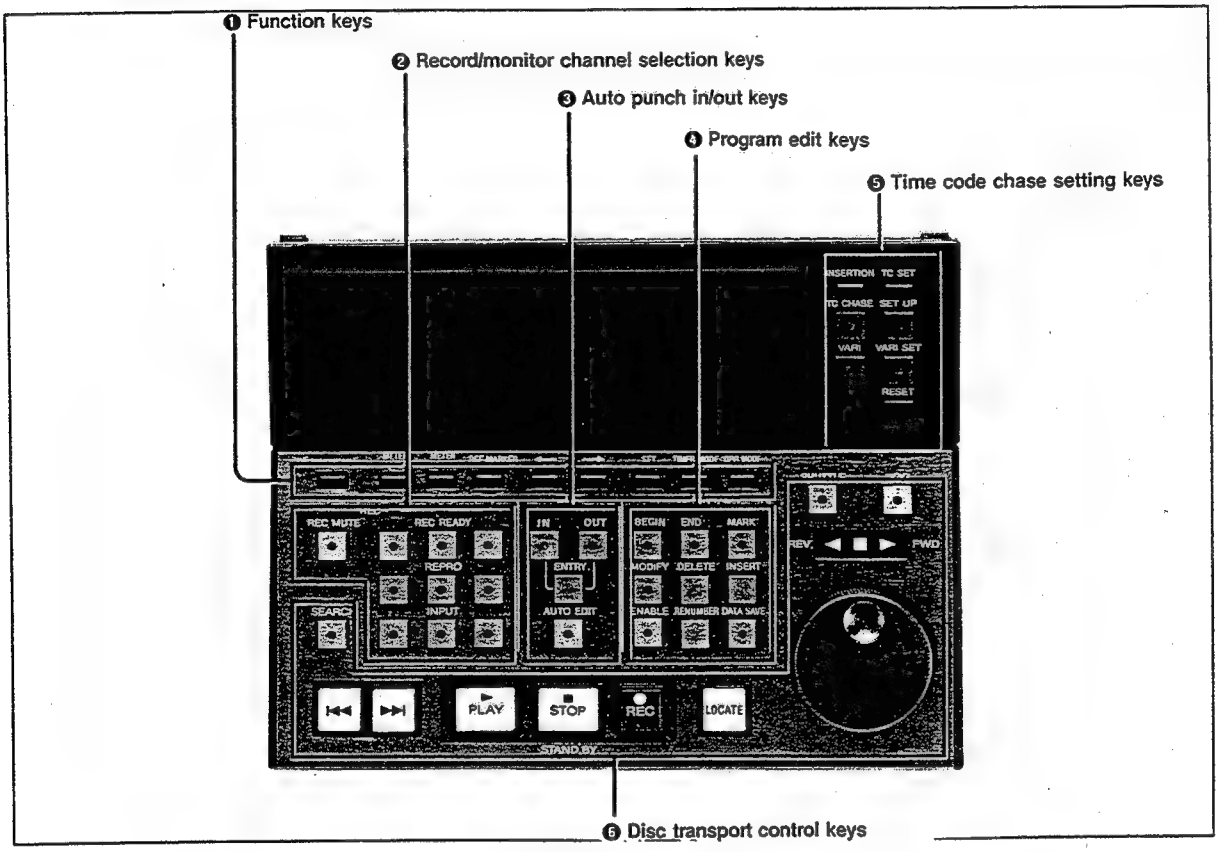
CUE DATA OUT connector (XLR-3-32)
Outputs cue data to the DAQ-1000.

REMOTE connector (36-pin)
Connects to the VTR REMOTE connector of the DAQ-1000 to enable control of the PCM-9000 from the DAQ-1000.

STATUS OUT connector (D-sub 25-pin)
Connects to the EDITOR TRANSFER INPUT connector on the DAQ-1000.

2-2. RM-D9000

2-2-1. RM-D9000 Control Panel



RM-D9000 control panel

(1) Function keys

REPEAT key

Used to repeatedly play back audio between two specified points.

Press this key to start repeat playback from the current point, then press the key again at the desired end point. To stop repeat play, press the STOP key.

For details, see "4-3-1. Playing Back".

METER RESET key

Press to reset the held peak level when the level meter is in peak hold status.

METER SCALE key

Press to set the display scale of the level meter to normal, fine, or bit mode.

For details, see "3-3. Setting the Level Meter Display".

REF MARKER (reference marker setting) key

Used to adjust the analog input signal levels.

For details, see "4-2-3. Adjusting the Input/Output Signal Levels".

← and → keys

Press these keys to move the cursor to the left or right when entering time code data, and so on.

SET key

Used to register files, and so on.

For details, see "5-3. Making Files".

TIMER MODE key

Press to change the timer display mode. Every time the key is pressed, the mode changes.

OPR MODE (operation mode selection) key
Press to set the operation mode to disc, file, copy, or normal operation mode. The selected mode indicator appears in the display window.
For details, see "4-1. Overview of Operation Modes".

(2) Record/monitor channel selection keys

REC MUTE (mute signal recording) key
Press to record mute signals on the channels set with the REC READY keys.
For details, see "4-2-5. Recording".

REC READY (recording ready) keys
Press the REC READY key corresponding to the channel to set to recording ready status. When the PCM-9000 is set to sync recording mode, audio channels 1 (CH-1) and 2 (CH-2), as well as the time code channel (TC), can be selected independently.
In monitor recording mode, all channels are set to the recording ready state when the REC READY key for any one channel is pressed.

REPRO (playback monitor) keys
Press the REPRO key corresponding to the channel whose playback signal you want to monitor. When the PCM-9000 is set to sync recording mode, audio channels 1 (CH-1) and 2(CH-2), as well as the time code channel (TC), can be selected independently.

INPUT (input monitor) keys
Press the INPUT key corresponding to the channel whose input signal you want to monitor. When the PCM-9000 is set to sync recording mode,audio channels 1 (CH-1) and 2 (CH-2), as well as the time code channel (TC), can be selected independently. Regardless of the setting, the selected channels are automatically set to input signal monitoring status during sync recording.

(3) Auto punch in/out keys

IN key
While holding down the ENTRY key, press this key to specify the recording start point (in point) for automatic punch in/out.

OUT key
While holding down the ENTRY key, press this key to specify the recording end point (out point) for automatic punch in/out.

ENTRY key
Press this key and the IN or OUT key simultaneously to enter the in or out point for the automatic punch in/out.

AUTO EDIT key
Press to execute automatic punch in/out recording.
For details, see "4-2-6. Automatic Punch In/Out".

(4) Program edit keys

BEGIN key
Press to specify or recall the start point (begin point) of a track to be registered.
For details, see "5-2. Making Tracks".

END key
Press to specify or recall the end point of a track to be registered.
For details, see "5-2. Making Tracks".

MODIFY key
Press to modify the begin,end or mark point of a registered track or mark point.
For details, see "5-2-2. Modifying Tracks/ Marks".

MARK key
Press to specify or recall the mark point.
For details, see "4-4-3. Searching with MARK/ BEGIN/END keys".

DELETE key
Used to delete a specified mark point, track or file.
For details, see "5-2-3. Deleting Tracks/Marks" or "5-3-2. Deleting a File".

INSERT key
Used to insert a new track into a specified file.
For details, see "5-3-1. Making a File".

ENABLE key
Press this key, such that it lights, to enable the registration, modification, and deletion of mark points, tracks and files, as well as the renumbering of tracks.

RENUMBER key
Used to renumber mark point and track ID numbers according to the AAIP order on a disc.
For details, see "5-2-4. Renumbering Tracks".

DATA SAVE key
Press to save edit data to the disc.
For details, see "5-5. Saving the Edit Data".

(5) Time code chase setting keys

INSERTION key
Press to activate the insertion function. This function allows you to use external equipment to add an effect to the playback signal, and to record the modified signal with another PCM-9000. The optional DABK-9007 Memory Board must be installed to use the insertion function.

TC SET (time code set) key
Used to set the offset time of Disc Time (AAIP) for display and output.

TC CHASE (time code chase) key
Press to execute time code chase. To execute the time code chase function, the optional DABK-9003 must be installed.
For details, see "6-3. Executing Time Code Chase".

SETUP key
Press to set the time code chase parameters to one of the following:

- Disc time/locate point display (normal display)
- Chase mode menu: used to set time code chase mode.
- Lock window setting menu: used to set the lock window value (the allowable difference between the playback and external time codes) for time code chase.
- Display window setting menu: used to set the display window value (the PLAY key flashes if the difference exceeds this value) for time code chase.
- Re-sync window setting menu: used to set the re-sync window value (allowable variation in playback speed for vari-sync playback) for time code chase.
- Offset time setting menu: used to set the sync offset time (a constant margin relative to an external time code) for time code chase.
- Offset error display: shows the offset error ((playback time code) - (external time code) - (sync offset time)).

VARI (variable) key
Press to execute variable speed playback at a specified speed.
For details, see "4-3-2. Variable Speed Playback".

VARI SET (variable speed set) key
Press to set the variable speed.
For details, see "4-3-2. Variable Speed Playback".

RESET key
Press to reset the sync offset time, parameters for time code chase or to reset vari speed value and time code offset value.
For details, see "3-2-2. Setting the Time Code Offset","4-3-2. Variable Speed Playback","6-2. Setting for Time Code Chase".

(6) Disc transport control keys

END SEARCH (recording end point search) key
Press to locate to the address which is 2seconds after from last rec ID (the end point of the recorded section on the disc).

⏮ (previous rec ID/track search) key
In normal operation mode, press this key to locate the previous rec ID (ID assigned to each recording). In disc or file operation mode, press this key to locate the previous begin point of a track.
For details, see "4-4-4. Searching for Rec IDs".

⏭ (next rec ID/track search) key
In normal operation mode, press this key to locate the next rec ID (ID assigned to each recording). In disc or file operation mode, press this key to locate the next begin point of a track.
For details, see "4-4-4. Searching for Rec IDs".

PLAY key
Press to start playback.

For details, see "4-3-1. Playing Back".

STOP key
Press to stop the disc transport.

REC (recording) key
Press this key and the PLAY key simultaneously to start recording.
For details, see "4-2-5. Recording".

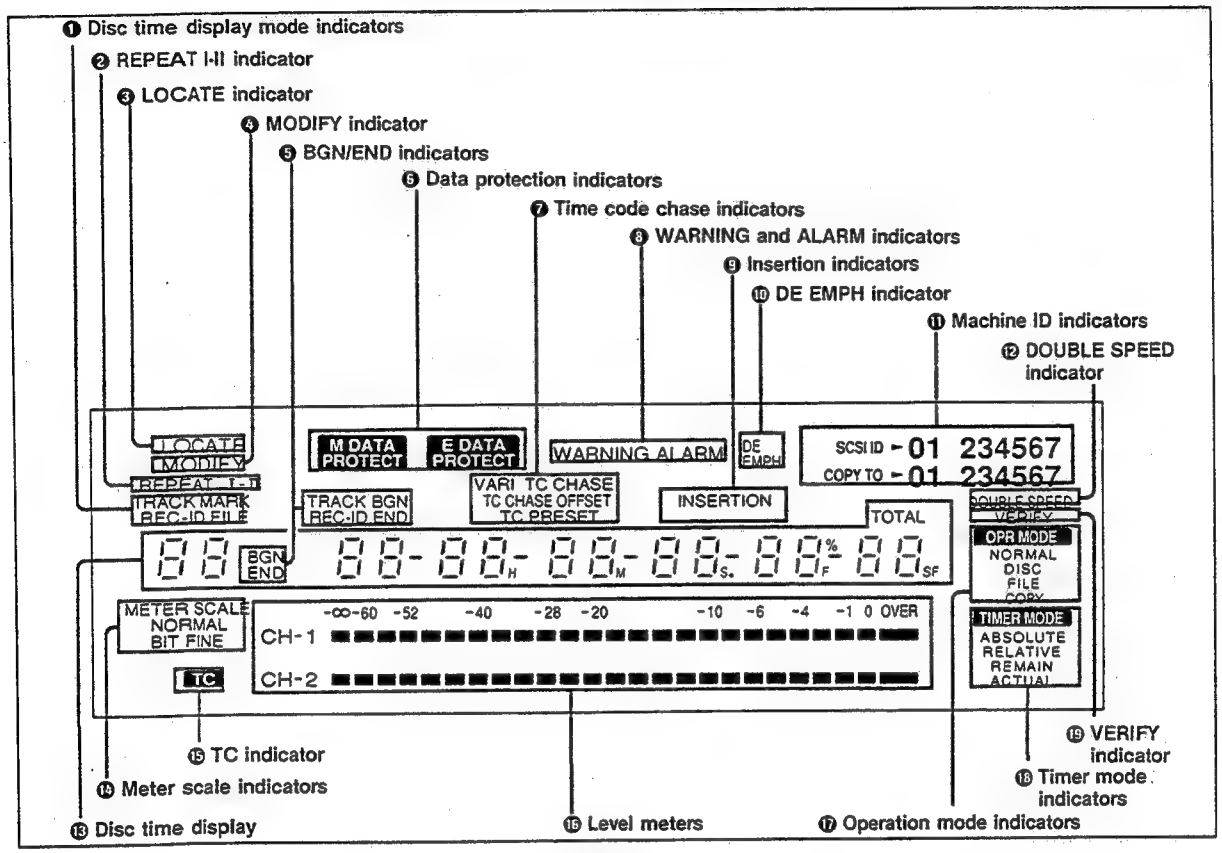
LOCATE key
Press to locate the specified mark, rec in/out and track begin/end point.
For details, see "4-4-2. Searching with specified address","4-4-3. Searching with MARK/LOCATE keys".

SHUTTLE key
Press this key, such that it lights, to enable shuttle mode playback. In this mode, you can make a rough search, at speed corresponding to the rotation angle of the search dial.
For details, see "4-4-1. Searching with Jog/Shuttle".

JOG key
Press this key, such that it lights, to enable jog mode playback. In this mode, you can make a precise search for a point in the program by turning the search dial.
For details, see "4-4-1. Searching with Jog/Shuttle".

Search dial
The search dial has the following two functions.
- Changing the search speed during jog/shuttle mode playback
- Setting parameters (the begin/end points of a track, mark points and so on)

2-2-2. Display Window



Display window

(1) Entry ID indicators

Light to indicate the conditions of the entry ID indication area, as follows:

- TRACK: The track number is displayed.
- MARK: The mark point number is displayed.
- REC-ID: The rec ID number is displayed.
- FILE: FILE number is displayed.

(2) REPEAT I-II indicator

Lights during repeat playback. Press the REPEAT key once at the repeat start point. The REPEAT I- indicator will flash. Press the REPEAT key again at the repeat end point. The REPEAT I-II indicator will light steadily, after which repeat playback starts.

(3) MODIFY indicator

Lights while you are modifying edit data.

(4) Current ID indicators

One of following indicators lights to distinguish the type of data being displayed:

- TRACK: lights while the BGN or END indicator is lit for a track.
- REC-ID: lights while the BGN or END indicator is lit for a rec ID.
- BGN: lights while a track begin or recording in point is being displayed by the disc time display.
- END: lights while a track end or recording out point is being displayed by the disc time display.

(5) Data protection indicators
Indicate the data protection status of the loaded disc, as follows:
M. DATA PROTECT: Audio data on the disc is protected (the REC PROTECT switch on the disc is set to the MAIN DATA position).
E. DATA PROTECT: Audio and edit data on the disc is protected (the REC PROTECT switch on the disc is set to the MAIN/EDIT DATA position).

Note
A lit E. DATA PROTECT indicator does not mean that edit data in the PCM-9000 memory is protected, but that the edit data recorded on the disc is protected. In this status, you cannot save new edit data to the disc.
For details, See "3-4-4. Preventing Accidental Erasure".

(6) Time code chase indicators
Indicate the status of the time code chase function, as follows:
- VARI: lights during variable speed playback.
- TC CHASE: lights during time code chase.
- TC CHASE OFFSET: lights while the sync offset time is being displayed by the disc time display.
- TC PRESET: lights while the time code offset is being set . (This offset time is not related to the sync offset time for time code chase.)

(7) WARNING and ALARM indicators
Light in the following cases:
- WARNING: lights when an invalid operation is detected.
- ALARM: Lights if a misoperation is detected.

(8) INSERTION indicator
Lights while insertion is being executed.

(9) DE EMPH (de-emphasis) indicator
Lights when playback signals are emphasized.

(10) SCSI ID indicators
Indicate the following:
- SCSI ID: shows the SCSI ID of this unit.
- COPY TO: shows the SCSI ID of the target PCM-9000 to be used for program copy function.

(11) DOUBLE SPEED indicator
Lights when double-speed program copy is being executed through the SCSI interface. This function requires the installation of the optional DABK-9005 SCSI Interface Board.

(12) Disc time display
Shows the following two kinds of information:
- Time code: the AAIP (converted from block addresses that have been pre-grooved on a disc) or the EXT TC (recorded to a disc from external equipment) for the currently located position, a track BEGIN/END point, or a mark point.
- Track numbers registered in the file
- Messages

(13) Meter mode indicators
One of the following indicators lights to indicate which level meter scale is being used.
- NORMAL: Normal scale (peak meter mode)
- FINE: Fine (magnified) scale
- BIT: Bit length scale

For details, see "3-3. Setting the Level Meter Display".

(14) TC (time code) indicator
When EXT TC (external time code) is selected, lights in the following cases:
- The external time code is being input to the unit in input signal monitoring status.
- The time code recorded on the disc is being played back.

In both cases, the indicator will flash (when an over level signal is being played back or input), light (appropriate level signal) or go out (under-level signal).

(15) Level meters
Indicate the input or playback signal levels.

(16) Operation mode indicators

One of the following indicators lights to indicate the current operation mode.

- NORMAL: Normal operation mode (with a sequential recording/playback operation, such as with a conventional tape recorder)
- DISC: Disc operation mode (playback only, such as a CD player)
- FILE: File operation mode (file playback only)
- COPY: Copy operation mode (copying through the SCSI interface)

See "4-1. Overview of Operation Modes" for details of operation modes.

(17) Timer mode indicators

One of the following indicators lights to indicate the current timer mode.

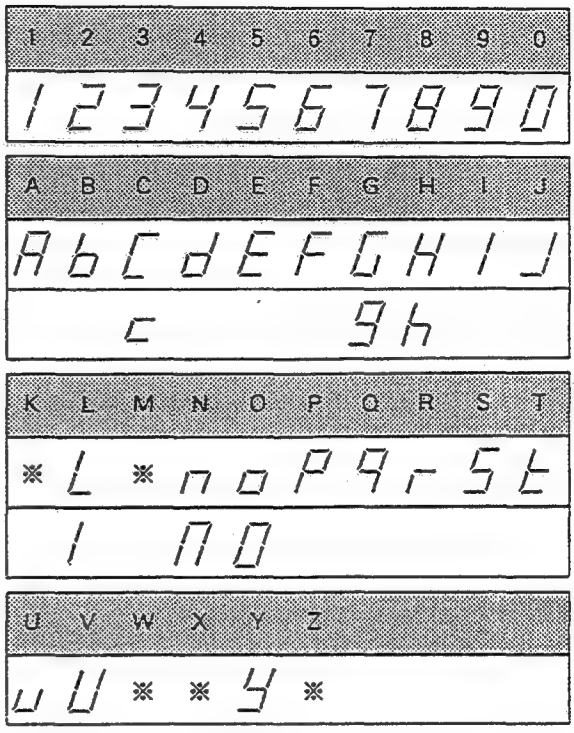
- ABSOLUTE: Absolute time code
- REMAIN: Remaining time left on a disc, or remaining play time left in a track/file
- ACTUAL: Elapsed play time in a track/file

(18) Playback time code error indicator

Go out if the unit detect the error during playback of the time code channel.

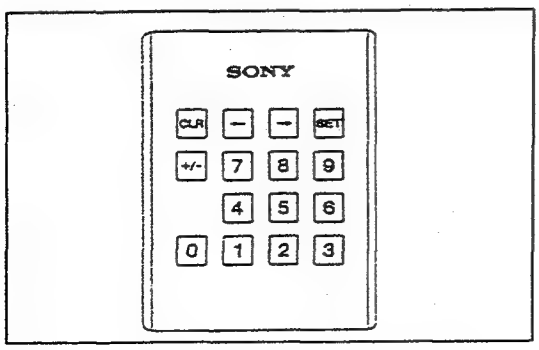
Characters used in the disc time display

The following characters are used to represent numeric and alphabetic characters in the disc time display.



※ Not used in the display

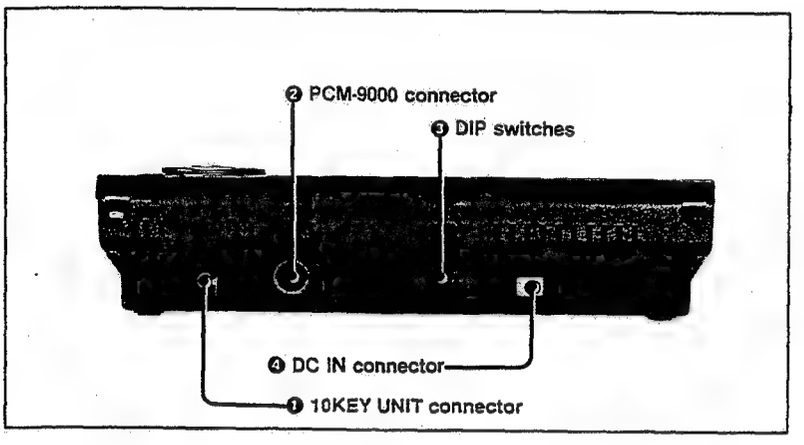
2-2-3. 10 Key unit



10 key unit

The numeric keypad allows you to enter time code addresses and other values directly, without using the search dial.
You cannot connect the 10 key unit while the RM-D9000 is attached to the PCM-9000 front panel. Connect the RM-D9000 to the connector on the PCM-9000 rear panel, then connect the 10 key unit to the RM-D9000.

2-2-4. RM-D9000 Connector Panel



RM-D9000 connector panel

(1) 10KEY UNIT connector (Round 8-pin)
Used to connect the 10 key unit supplied with the RM-D9000.

(2) PCM-9000 connector (Round 10-pin)
Used to connect the RM-D9000 to the REMOTE connector (Round 10-pin) on the front panel or connector panel of the PCM-9000, using the 10-pin cable supplied with the RM-D9000.

(3) DIP switches
Switches 1 to 3: Overload indication adjustment switches
Used to set the number of words corresponding to full scale (overload signals) which are continuously input to the unit, and which are indicated with the OVER level indicators of the level meters.

Number of words	Switch 1	Switch 2	Switch 3
1	OFF	OFF	ON
2	OFF	ON	OFF
3	OFF	ON	ON
4	ON	OFF	OFF
5	ON	OFF	ON
6	ON	ON	OFF
7	ON	ON	ON

Factory setting: 4 words (Switch 1: ON, Switch 2, 3: OFF)

Note
If all switches (switches 1 to 3) are set to OFF, the meters will always indicate an overload level. Set at least one of these switches to ON.

Switches 4 to 8: Mode selectors
Used to select the level meter indication mode. They set the peak hold time and determine whether the overload peak level indication is to be held.

Swicth Number	Function	Set to ON	Set to OFF
4	Overload level setting	-0.2 dB	0 dB
5	Reserved		
6	Peak hold time (when switch number 7 is set to ON	1.5 seconds	Continuous
7	Peak holding	Held	Not held
8	Test mode	Test mode	Normal mode

Factory setting: Switch number 4 is set to ON, all other switches are set to OFF.

Notes
- Set switch number 4 to ON when the DABK-9001 Converter Board is installed.
- Test Mode (sw No.8) can be set in the Power Off condition only.

(4) DC IN connector
Connects to an external power supply (9 V to 12 V DC). By using an external power supply and optional cable, the RM-D9000 can be remotely controlled from a distance of 20 m.

Chapter 3 Preparations

This chapter describes the preparations necessary prior to operating the PCM-9000. Included are basic connections, switch settings, and disc handling.

3-1. Basic System Connections

This section describes how to attach/detach the RM-D9000, and presents basic system configurations.

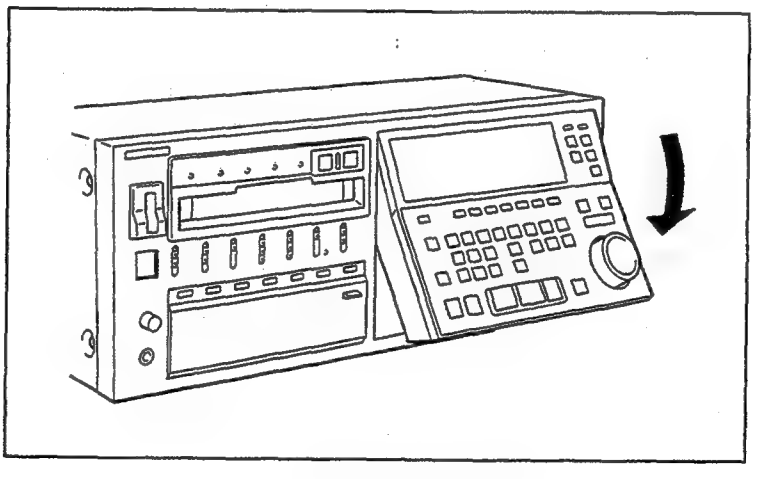
3-1-1. Attaching/Removing the RM-D9000

Attaching the RM-D9000

Attach the RM-D9000 to the PCM-9000 by following the procedure.

1 Connect the REMOTE CONTROLLER connector on the PCM-9000 front panel to the PCM-9000 connector on the RM-D9000 upper side panel, using the 10-pin cable supplied with the RM-D9000.

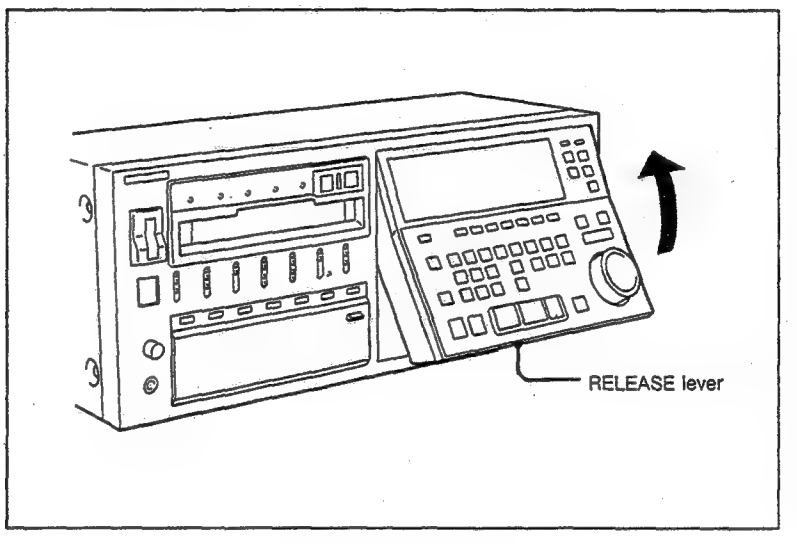
2 Align the top edge of the RM-D9000 with the recess in the PCM-9000 front panel, then push the RM-D9000 into the PCM-9000.



Attaching the RM-D9000

Detaching the RM-D9000

Move the RELEASE lever to the right, then detach the RM-D9000 from the PCM-9000. This lever is located at the lower edge (right side) of the PCM-9000 front panel.



Detaching the RM-D9000

3-2. Time Data Display

3-2-1. Operation Modes and Time Data Display

The time data displayed in the disc time display differs with the operation mode, kind of time code (AAIP/EXT TC), and timer mode. The following tables list the time data displayed in each operation mode.
For details of the operation modes, see "4-1. Overview of Operation Modes".

Time data display in normal operation mode

In normal operation mode, ABSOLUTE and REMAIN timer mode can be used when you select AAIP as the operating time code. Only the ABSOLUTE time code is output as the time code signal , however, time code offset setting is available (with the optional DABK-9003 installed).
When you select EXT TC as the operating time code, ABSOLUTE timer mode is automatically set as the timer mode.

Timer Mode	Time code	AAIP offset setting	Time data displayed
ABSOLUTE	AAIP	Available	(AAIP absolute value) = (Time code converted from block address on disc) + (AAIP offset)
REMAIN	AAIP	Unavailable	(Largest AAIP value for a disc (Total recording time available on a disc)) - (Current AAIP address)
ABSOLUTE	EXT TC	Unavailable	External time code, recorded on time code channel of the disc

Time data display in disc operation mode

In disc operation mode, the ACTUAL and REMAIN timer modes can be used.

Timer mode	Time code	AAIP offset setting	Time data displayed
ACTUAL	AAIP	Unavailable	(Elapsed time from track begin point) = (Current AAIP absolute value) - (AAIP value of track begin point)
REMAIN	AAIP	Unavailable	(Remaining time till track end point) = (Current AAIP absolute value) - (AAIP value of track end point)

Notes
- The time code is automatically set to AAIP in the disc operation mode, regardless of any previous switch settings.
- Only the ACTUAL time code is output as the time code signal (with the optional DABK-9003).
- In the disc operation mode, time code offset cannot be added to eather the display time code or output time code.

Time data display in file operation mode

In file operation mode, you can set the contents of the file or timer indication.
In file operation mode, the timer indication can be set to either of two modes, as follows:

- Timer indication for a file
- Timer indication for a track

In file operation mode, the time code is automatically set to AAIP.
For details of setting time code offset in file operation mode, see "3-2-2. Setting the Time Code Offset".

Displaying timer indication for a file

With the cursor positioned to the file number indication of the entry ID indication area, you can display the following timer indications by pressing the TIMER MODE key the appropriate number of times.

Timer mode	Time code	AAIP offset setting	Time data displayed
ABSOLUTE	AAIP	Available	Elapsed time from beginning of the file
REMAIN	AAIP	Unavailable	Remaining time to the end of the playback file

To cancel the timer indication and display the file contents, press the TIMER MODE key again.

File contens ← File absolute time ↓ File remain time → (back to File contens)

Timer indication during playing back a file

The relation between pressing the TIMER MODE key and displaying the time is as follow.

1 When you select the ABUSOLUTE TIME in the upper event.

File absolute time ↓ File remain time ↓ File contents ↓ File absolute time ↓ Track actual time ↓ Track remain time → (back to File contents)

2 When you select the REMAIN TIME in the upper event.

File remain time ↓ File contents ↓ File absolute time ↓ Track actual time ↓ Track remain time → (back to File contents)

Timer indication for tracks in the file

1 Press the OPR MODE key, such that the FILE indicator lights in the display window.

The unit enters file operation mode.

2 Press the → key to move the cursor to the desired track number or pause indication.
For details of manipulating the cursor movement, see chapter 5.

3 Press the TIMER MODE key.

The selected track number (or "-" when pause is selected) appears in the current ID indicator area.
Pressing the TIMER MODE key repeatedly changes the timer indication in the order of ABSOLUTE ,ACTUAL, and REMAIN .

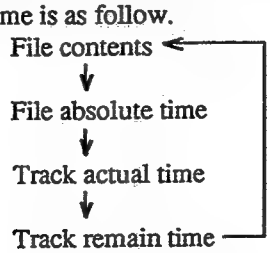
In REMAIN timer mode, pressing the TIMER MODE key returns the display to the file contents indication.

Timer mode	Time code	AAIP offset setting	Time data displayed
ABSOLUTE	AAIP	Available	Elapsed time from beginning of the file
ACTUAL	AAIP	Unavailable	Elapsed time from the begin point of the playback track
REMAIN	AAIP	Unavailable	Remaining time to the end point of the playback track

You can switch the timer indication for tracks regardless of unit status. So, you can switch the timer mode even if playback stops in the middle of the track.

Notes
- You cannot select an unregistered track for display.
- The playback file ABSOLUTE time code is output as the time code signal, regardless of the timer mode settings.
- When you select "no pause time in the making a file operetion",actualy there is about 0.1 second duration between two tracks. And also playing time and remaining time display in duse there durations.

The relation between pressing the TIMER MODE key and displaying the time is as follow.



3-2-2. Setting the time code offset

When AAIP is selected as the time code, you can add the time code offset to the displayed time code address in the following cases.

- Normal operation mode is selected.
- File operation mode is selected.
- In the file operation mode,you can set the time code offset on each file.

Setting the offset time

1 Press the TC SET key.

The disc time display changes as below. The cursor is positioned to the seconds digit.

2 Press the ← or → key to move the cursor to the digit you want to change.

The digit pointed to with the cursor flashes.

3 Use the search dial or 10 key unit to change the digit to the desired value.

When you set the offset time using the10 key unit,you move the cursor to the minimum digit which you want to enter,and set in the order of Hours,Minutes,Seconds and Frames.

4 Press the SET key.

The set value is registered as an offset.

5 Press the TC SET key.

Notes

- In the case of entering the value from 10 key unit,,when you enter the MINUTE after entering the HOUR,then the HOUR digit is cleared.So as the MINUTE and SECOND.
- In the file operation mode,at first you select the file No. then you perform the prosedure.
- After you set the time code offset value,if you change the time code format,the offset value ic also changed to match the time code format.
- After setting the offset value,when you perform the DATA SAVE operation,the offset value is saved on the disc with the time code format.Then when you insert this disc,the offset value is set to the value which is on the disc automatically

To reset the offset value to 0

1 While the offset time is displayed, press the RESET key on the RM-D9000 or the CLR key on the 10 key unit.

2 Press the SET key.

The offset time is reset to 0.

3-3. Setting the Level Meter Display

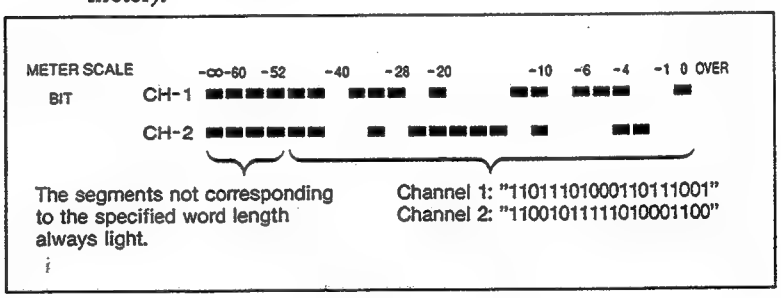
The PCM-9000 allows you to set the scale and peak hold mode of the level meters.

Setting the meter scale

Press the METER SCALE key to change the level meter scale. The mode indicators light in the following order:

- NORMAL mode: Normal peak level meter display
- FINE mode: One segment of the display represents 0.2 dB, with a reference marker indicating the reference level. The "0" segment flashes when the level exceeds the scale range (over scale), and the "-60" segment flashes when the level is below the scale range (under scale).
- BIT mode: One segment of the display represents a single bit. When the unit is input signal monitoring status,the number of segment which are flashing indicates the word length of the input signal.So you can check the word length.

When the unit is in playback signal monitoring status, the indication word length depends on the word length of the playback signal. Those segments that do not correspond to the specified word length will be unlit (in the left part of the level meter).



BIT mode (Example: word length = 20bits) level meter display

Setting the meter mode

By setting the DIP switches on the RM-D9000 connector panel, you can switch the peak hold and over-scale indications of the level meters, adjust the over scale, and so on.
For details of the mode and parameters to be set with the DIP switches, see "2-2-4. RM-D9000 Connector Panel".

3-4. Handling the PCM-9000 and Discs

The PCM-9000 uses 5.25-inch magneto-optical (MO) discs as its recording medium. This section provides notes on the installation, disc handling, data protection, and so on.

3-4-1. Notes on Installation

When installing the PCM-9000, note the following:

- Install the unit on a level surface, no more than 5degrees from the horizontal. If the unit is not level, it may malfunction.
- Install the unit in a location where it will not be subjected to vibration or shock. Failure to do so may result in sound skipping.
- Do not install the unit in locations subject to high temperatures (more than 40 C). High temperature will shorten the life of the laser.

3-4-2. Supported Discs and Notes on Disc Handling

Supported discs

Use MSD-1200 Digital Audio Master Discs. These are designed for use with the master disc recorder.
Note that you cannot use MO discs designed for computer data storage.

Handling disc

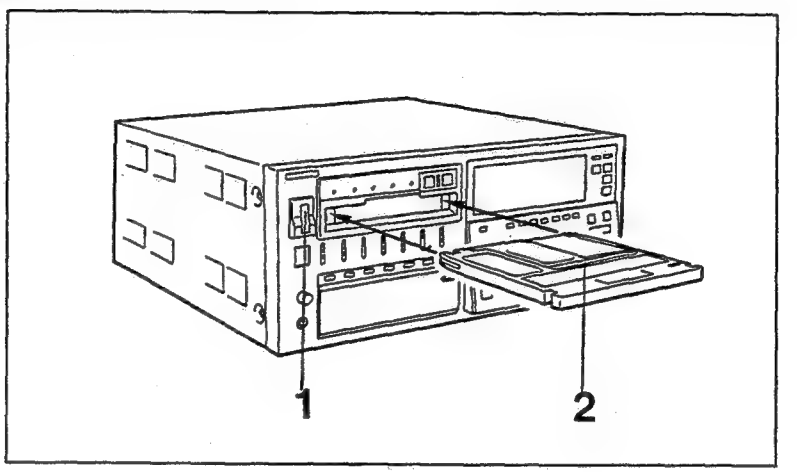
- Do not drop a disc cartridge or subject it to any extreme shocks or vibration.
- Never open the disc catridge's shutter or touch the disc inside. The shutter is desinged to open automatically when the cartridge is inserted into the drive.
- Do not use the cartridge under conditions of high humidity or wide temperature fluctuations. Condensation on the disc may make it impossible to read or write data.

Storing discs

Store disc cartridges in their cases in a cool place.

3-4-3. Inserting and Ejecting a Disc

Inserting a disc



1 Turn on the PCM-9000.

2 Insert a disc.

The PCM-9000 loads the disc.
After the unit reads the auxiliary data on the disc, the STOP key lights to indicate that the unit is operable.

Note
If you turn off the power of the PCM-9000 while a disc is loaded to the unit, the disc is automatically ejected.

In the event that the data is not completely read from the disc,simply eject the disc and insert again.

(Continued)

Ejecting a disc

After pressing the EJECT key, one of followings occurs.

- If you have neither recorded new material or performed program editing, the disc is ejected immediately. Also, even if you have performed after either operation, but have already saved your data, the disc will be ejected immediately.
- If you have recorded new material, the EDIT DATA SAVE key lights, the edit data is automatically recorded onto the disc. Once the data has been saved, the disc is ejected automatically.
- If you have performed program editing but have not saved your data, the EDIT DATA SAVE key flashes to warn you that the edit data has not been saved.

  To save the edit data: press the EDIT DATA SAVE key. The unit writes the data to the disc, after that press the EJECT key, the disc will be ejected.
  To abandon your edit data: press the EJECT key again. The disc is ejected.

If the REC PROTECT switch on the disc is set to any recording protect position, the disc is ejected immediately. No data can be written to the disc.
To save your editing, set the REC PROTECT switch to the recordable position and insert the disc again. Then, press the EDIT DATA SAVE key.
If you do not want to save the edit data, press the EDIT DATA SAVE key, such that the key indicator goes out.
In the event you wish to insert another disc
,EDIT DATA SAVE key will go out without any conditions.
For the REC PROTECT,see "3-4-4.Preventing Accidental Erasure".

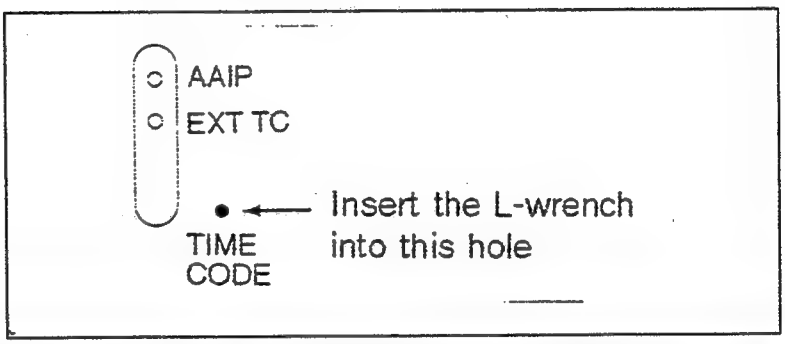
Forcibly ejecting a disc

In emergencies, you can eject a disc forcibly.

1 Turn off the power.

2 Insert the supplied L-wrench into the hole (illustrated below) and push.

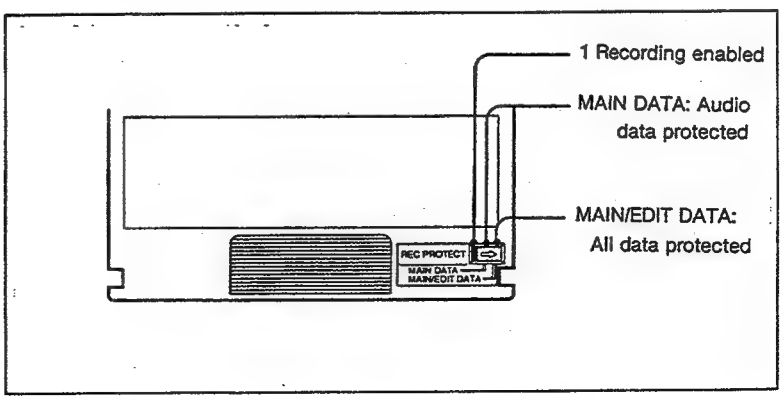
The disc is ejected.



3-4-4. Preventing Accidental Erasure

Disc cartridges are equipped with a REC PROTECT switch (red tab) to prevent the accidental erasure of data on the disc or the inadvertent writing of unwanted data.
The REC PROTECT switch can be set to any of three positions: two for protection, and one for writing.

- Leftmost position: All data can be written.
- MAIN DATA: Audio data on the disc is protected. You can write edit data.
- MAIN/EDIT DATA: All data (audio and edit data) is protected. You can only read data from the disc.



Disc REC PROTECT switch

3-4-5. Cleaning a Disc

Dust and stains may accumulate on a disc when it is used for a long period of time. To avoid resultant data read/write errors, clean the disc using the optional disc cleaning kit. To maintain high performance and prolong the useful life of a disc, clean it at least once every three months.
In addition, check your data, by performing disc checks periodically.
See "7-1. Checking a Disc".

Cleaning kit

Use the Sony MOA-D51 Disc Cleaning Kit. Do not use any other type of disc cleaner as this may result in data read/write errors.
Cleaning instructions are given in the manual supplied with the disc cleaning kit.

Chapter 4
Basic Operations

This chapter explains basic operations of the PCM-9000, and includes an explanation of the operation mode, recording, playback, and searching.

4-1. Overview of Operation Modes

The PCM-9000 can operate in the following four operation modes. While the disc is stopped, you can select the desired operation mode by pressing the OPR MODE key.

Normal operation mode

This mode is used to record external audio data prior to its being edited. Making tracks and registering mark points can also be done in this mode.
You can locate the desired point by using registered rec IDs, track begin/end points and mark points.

Disc operation mode

This mode is used to play back each track. You can locate a desired point by registering mark points.

File operation mode

This mode is used to make files and execute program editing. Only registered files can be played back in this mode. By manipulating the editing data in this mode, you can make and play back files, containing desired tracks, in any order.
For details of making tracks and files, see "Chapter 5 Program Editing".

Copy operation mode

This mode is used to copy the contents of a disc.
For details of copying a file, see "5-6. Copying a Program".

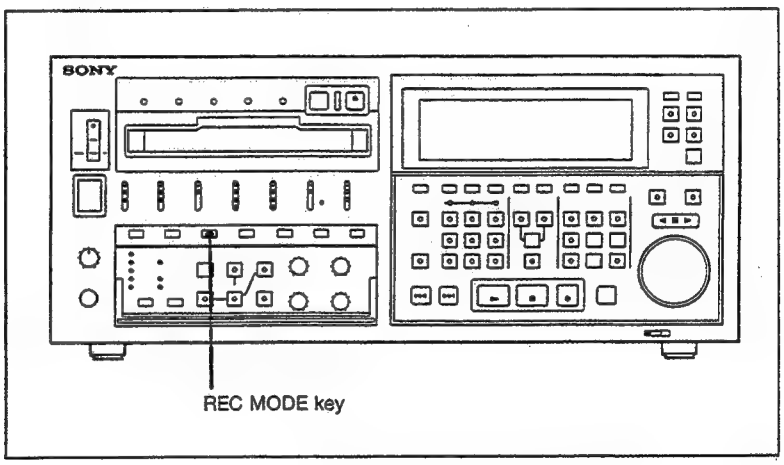
4-2. Recording

This section explains recording procedures, in the following order:

- Recording mode selection
- Record/monitor channel selection
- Input/output signal level adjustment
- Recording an external time code
- Recording operation
- Automatic punch in/out

4-2-1. Selecting Recording Mode

The PCM-9000 can operate in either of two recording modes: monitor recording mode or sync recording mode.
Select the recording mode appropriate to the recording situation and source.



Selecting the recording mode

Selecting monitor recording mode

Monitor recording mode is intended for monitoring sound while it is being recorded. Continuity of the PCM data between previously and newly recorded signals is not preserved and the setting of individual channels for recording is impossible in this mode. Recording is performed for all channels (CH-1, CH-2, TC) together.
To select monitor recording mode, press the REC MODE key on the PCM-9000, such that the MONITOR indicator lights.

Selecting sync recording mode

In sync recording mode, recording is executed while preserving the continuity of the PCM data.
Therefore, punch in/out is possible in this recording mode, as is individual channel setting.
To select sync recording mode, press the REC MODE key on the PCM-9000, such that the SYNC indicator lights.

4-2-2. Selecting Record/Monitor Channels

You can select the channel status for each channel (CH-1, CH-2, TC) when recording, playing back or monitoring.

Setting a channel to recording ready status

- In sync recording mode, you can set each channel's status individually: press the REC READY key on the RM-D9000 corresponding to the channel to be set. The corresponding indicator will light.
- In monitor recording mode, you cannot set each channel's status individually. If you press any of the REC READY keys on the RM-D9000, all channels are set to recording ready status.
- In both sync recording and monitor recording mode, you can simultaneously set all channels to recording ready status by simply pressing the REC READY key on the PCM-9000.

Setting a channel to playback signal monitoring status

Press the REPRO key on the RM-D9000 corresponding to the channel to be set. The corresponding indicator will light.
In sync recording mode, all channels are automatically set to input signal monitoring status while recording (The REPRO and INPUT key indicators light automatically).

Setting a channel to input signal monitoring status

Press the INPUT key on the RM-D9000 corresponding to the channel to be set. The corresponding indicator will light.

4-2-3. Adjusting the Input/Output Signal Levels

You can adjust the analog input/output signal level by using the reference marker (with the optional DABK-9001).

Selecting a channel to be adjusted

Set the DIP switches on the DABK-9001 Converter Board corresponding to the channel and level range you want to adjust.

	Switch Number	
	Adjusting input level	Adjusting output level
CH 1	S103	S104
CH 2	S203	S204

DIP switch setting	Maximum input level		Head room	
	range	Vol center	range	Vol center
Only bit 4 is set to ON	+22 to +26 dBs	+24 dBs	+18 to +22 dB	+20 dB
Only bit 3 is set to ON	+19 to +23 dBs	+21 dBs	+15 to +19 dB	+17 dB
Only bit 2 is set to ON	+16 to +20 dBs	+18 dBs	+12 to +16 dB	+14 dB
Only bit 1 is set to ON	+13 to +17 dBs	+15 dBs	+ 9 to +13 dB	+11 dB

For details of the location of the level range setting switches, see Chapter 5 of the Maintenance Manual.

Adjusting the input signal level

1 Press the METER SCALE key, such that the FINE indicator lights in the display window.

The -16 dB segment indicator of the level meter lights. The unit enters fine indication mode.

2 Press the REF MARKER key.

Each time you press the REF MARKER key, the level meter's reference marker moves to right in steps of 2 dB. The reference marker returns to the -20 dB position after exceeding the -10 dB position.
The level indication shows the head-room relative to digital full scale.

3 Set the channel to be adjusted to input signal monitoring status by pressing the corresponding INPUT key.

4 Input the reference signal to the LINE INPUT CH-1 or CH-2 connector on the DABK-9001.

5 Adjust the appropriate ANALOG LEVEL ADJUST IN control to match the input signal level to the reference marker level.

Note
In fine level indication mode, one segment represents 0.2 dB.

Adjusting the output signal level

After adjusting the input signal level, adjust the output signal level.
Adjust the appropriate ANALOG LEVEL ADJUST OUT control to match the output signal to the desired level.

Performing adjustment from the mixing console

1 Press the INPUT key corresponding to the channel to be adjusted. The channel is set to input signal monitoring status.

2 Adjust the ANALOG LEVEL ADJUST OUT control, such that the level meter on the mixing console indicates the desired level.

Using a recorded disc for adjustment

1 Record the adjusted input reference signal onto a disc.
For details of the recording procedure, see "4-2-5. Recording".

2 Press the REPRO key corresponding to the channel to be adjusted. The channel is set to playback signal monitoring status.

3 Press the PLAY key such that the recorded reference signal is played back.

4 Adjust the ANALOG LEVEL ADJUST OUT control, such that the level meter connected to the output signal indicates the desired level.

Note
When you use a digital I-O (AES/EBU,SDIF-2) for input signal, level adgustment is not available.

4-2-4. Recording External Time Code

You can record an external SMPTE/EBU format time code signal onto the TC (time code) channel by installing the optional DABK-9003.
For details of playing back the time code signal, see "4-3-3. Time Code Sync Playback".

Notes on recording an external time code

When you record external time code,the synchronized recording is recomended.
An external time code signal is recorded, without synchronization, in the following cases.

- When recording an external time code output from equipment which cannot be synchronized with other equipment. Such equipment includes analog tape recorders (ATR), and so on.
- To record time code signals that are not supported by the PCM-9000. For example, MIDI format time codes, and so on.

Recording an external time code with synchronization

1 Press the SYNC CLOCK key, such that the VIDEO indicator lights.

2 Press the TIME CODE key, such that the EXT TC indicator lights.

3 Press the TC FORMAT key, such that the indicator corresponding to the desired time code format lights.

4 Press the REC READY key of the TC channel.

5 Record the input signals.
For details of the recording procedure, see "4-2-5. Recording".

Recording an external time code without synchronization

The operation is the same as that explained above except that synchronization is not performed.

To output an input time code signal

The PCM-9000 can output time code signals when the optional DABK-9003 is installed. The output time code depends on the TC channel status.

- Input signal monitoring status: time code signal input to the TIME CODE IN connector
- Playback signal monitoring status: time code recorded on the TC channel (playback time code)

Note
You cannot add an offset to the output time code.

Regenerating an external time code

An input time code can be regenerated even if the input time code has many dropouts. To regenerate an input time code, press the GEN MODE key, such that the REGEN indicator lights.

Note
The time code offset, phase shift and related functions are cannot be used for a regenerated time code.

If the FORMAT indicator does not light steadily

If there is any difference between the input and regenerated time codes, the FORMAT indicator flushes.
If this occurs, press the TC FORMAT key. The FORMAT indicator will light steadily.

Note
The internal time code reader cannot discriminate between 30 frame/s and 29.97 frame/s NDF formats. Therefore, the FORMAT indicator will not light, even if the internal generator format is set to "30" or "29.97 NDF".

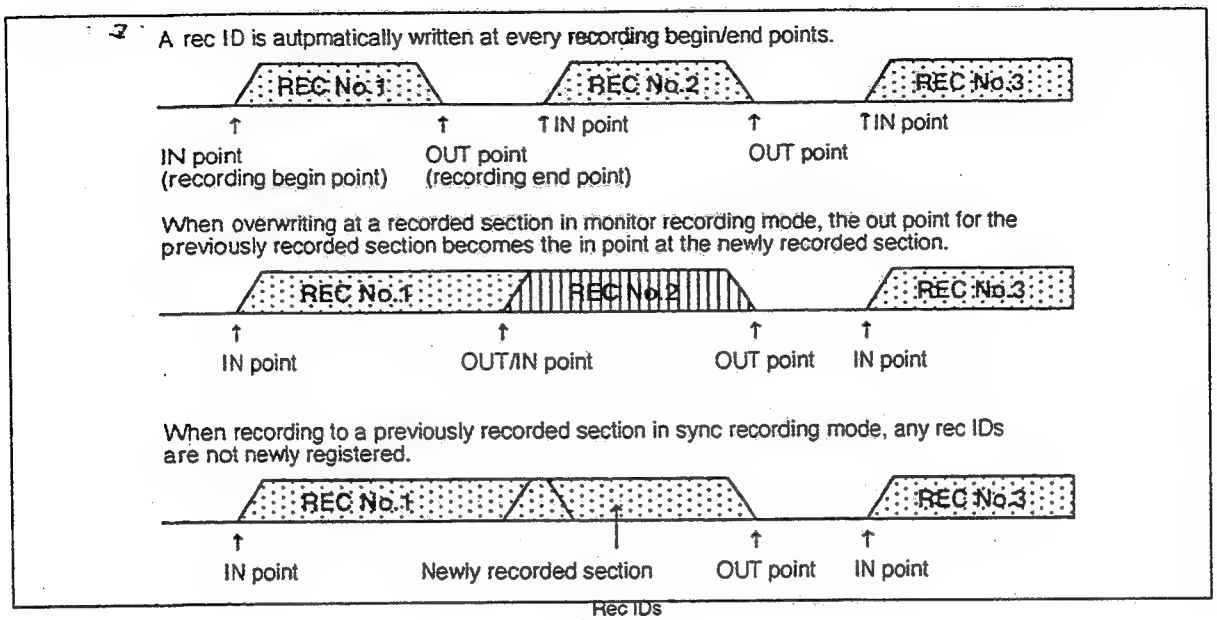
4-2-5. Recording

Once recording mode selection, channel setting and input signal level adjustment (when an analog signal is input) have been performed, the unit is ready to be used for recording.

What are rec IDs?

The MS disc format adopts rec ID system registered at recording begin/end point. As rec ID numbers (from 1 to 99) are assigned automatically, you cannot specify or change a rec ID number.
When recording to a previously recorded section in sync recording mode, any rec IDs are not newly registered.

Notes
- REC IDs can be resistered up to 99.
- **No REC ID is registered if the recording duration is less than two seconds.**
- After resistration off 99 REC IDs,the recording operation cannot de available.



Executing recording

To execute recording, follow the procedure below:

1 Monitor recording mode
(1) Press the REC MODE key, such that the MONITOR indicator lights.
(2) Select the sampling frequency, word length, time code format, and so on.
Sync recording mode
Press the REC MODE key, such that the SYNC indicator lights.

2 Press the REC READY key to set the desired channel to recording ready status.
In monitor recording mode, all channels are set to recording ready status when any of the REC READY keys are pressed.(When DABK-9003 is not installed, the time code channel keys do not work)

3 While holding down the REC key of the RM-D9000, press the PLAY key.

A rec ID (in point) is registered at the recording start point, and recording starts.

Stopping recording

Press the STOP key on the PCM-9000 or RM-D9000.
A rec ID (out point) is registered at the recording end point, and recording ends.

4-2. Recording

Recording muting signals

1 Press the REC MUTE key, such that its key indicator lights.

2 Press the REC READY key corresponding to the channels to which you want to record (in sync recording mode). Or, press the REC READY key, such that its key indicator lights (in monitor recording mode)

3 While holding down the REC key, press the PLAY key.

Recording starts, and muting signals are written to those channels that are in recording ready status.

4 Press the REC READY key corresponding to the recording channel. The indicator will go out.

Recording ends.

5 Press the REC MUTE key, such that its key indicator goes out.

Variable speed recording

You can execute variable speed recording at -12.5% to +12.5% normal recording speed, in increments of 0.1% normal playback speed.

1 Set the recording speed.
For details, see "4-3-2.Variable Speed Playback"

2 Press the VARI key, such that its indicator lights.

3 Press the REC READY key corresponding to the channels to which you want to record (in sync recording mode). Or, press the REC READY key, such that its key indicator lights (in monitor recording mode)

4 While holding down the REC key, press the PLAY key.

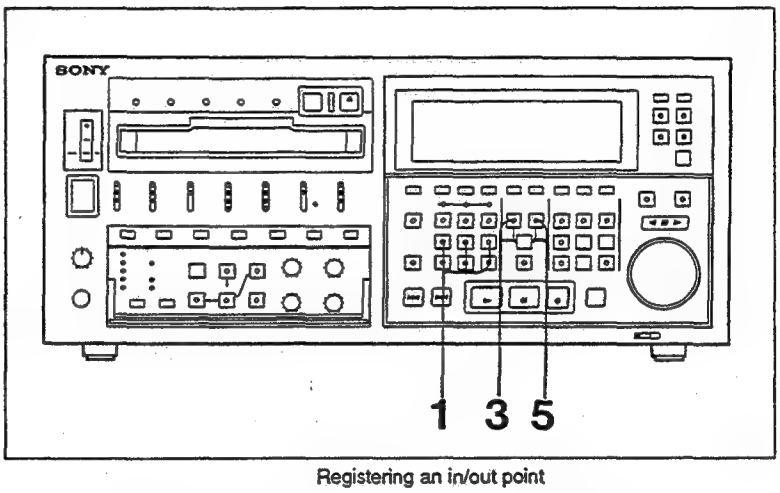
Recording starts at the stored variable speed.

Note
You cannot execute variable speed recording while executing time code chase in address mode.
If the clock mode is set to sharp, variable speed rec and playback is not available.

4-2-6. Automatic Punch In/Out

You can execute recording automatically between a designated recording start point (in point) and recording end point (out point) (Automatic punch in/out). You can also execute automatic punch-in/out while executing time code chase.
See, "6-3-3. Automatic Punch-In/Out during Time Code Chase".

Registering an in/out point



Registering an in/out point

1 Press the REPRO key to set the desired channel to playback signal monitoring status.

2 Locate the in point.

3 While holding down the ENTRY key, press the IN key.

The IN key indicator lights, showing that the in point has been registered.
The OUT key indicator flashes.

4 Locate the out point.

5 While holding down the ENTRY key, press the OUT key.

The OUT key indicator lights, showing that the out point has been registered.

Notes

- When you resistered only an IN point,the OUT point is resistered at the end of the disc automaticaly.
- When you resistered only an OUT point,the IN point is resistered at the top of the disc automaticaly.

4-2. Recording

Re-registering an in/out point

1 Press the IN (or OUT) key.

The current in (or out) point address appears in the display window.

2 While holding down the IN (or OUT) key, press the LOCATE key.

The time code address is located to the displayed address.

3 Locate the desired address.
For details of the jog function, see "4-4-1. Searching with Jog/Shuttle".

4 While holding down the ENTRY key, press the IN (or out) key.

The in (or out) point is re-registered.

Trimming an in/out point directly

1 While holding down the IN (or OUT) key, rotate the search dial.

The in (out) point indication in the display window changes as the search dial is rotated. Do not release the IN (OUT) key yet, even once the desired in (out) point address appears.

2 Press the ENTRY key. You may now release the IN (OUT) key.

The stored in (out) point address data is changed to the new address data, then stored in memory.

Note
Trimming is canceled if you release the IN (OUT) key while rotating the search dial in Step 1.

Recalling an in/out point

Press the IN(OUT) key.
While either key is pressed, the corresponding address data is displayed.

Rehearsing automatic punch in/out

1 Press the REC MODE key, such that the SYNC indicator lights.

2 Press the REPRO and REC READY key corresponding to the channel for which you want to execute automatic punch in/out.

3 Check that both the IN and OUT key indicators are lit. Then, press the PLAY key while holding down the AUTO EDIT key.

- Automatic punch in/out rehearsal is automatically executedfor those channels in recording ready status. The input signal between the in and out points can be monitored.
- Preroll time is about 8seconds and postroll time is about 3seconds.
  These are fixed values.

Executing automatic punch in/out

1 Press the REC MODE key, such that the SYNC indicator lights.

2 Press the REPRO and REC READY keys corresponding to the channel for which you want to execute automatic punch in/out.

3 Make sure that both the IN and OUT key indicators are lit. Then, while holding down the AUTO EDIT key, press the REC key.

Recording is automatically executed for those channels in recording ready status, between the in and out points. During punch in/out, their channel status is automatically set to input signal monitoring status.
Upon the completion of automatic punch in/out, the LEDs of IN and OUT keys go out , but the point data is not deleted.

Notes

- If an out point precedes an in point, "ILLEGAL" appears in the display window and execution of the recording is canceled.
- You cannot execute automatic punch in/out in monitor recording mode.
- Preroll time is about 8seconds and postroll time is about 3seconds. These are fixed value.

Re-executing automatic punch in/out after canceling execution

After checking the IN/OUT LED light,while holding down the AUTO EDIT key, press the REC key.(When the LEDs do not light,press IN or OUT key,then LEDs become light.)

Re-executing automatic punch in/out after completing execution

Press IN or OUT key.
The LEDs of IN and OUT keys light.
While holding down the AUTO EDIT key,press the REC key.

Locate operation to the IN or OUT point

While holding down the IN or OUT key, press the LOCATE key

4-3. Playing Back in Normal Operation Mode

The PCM-9000 supports various playback functions such as normal playback, repeat playback and variable speed playback.
For details of playing back tracks and files, see "Chapter 5 Program Editing".

4-3-1. Playing Back

Playing back

1 Press the OPR MODE key, such that the NORMAL indicator appears in the display window.

2 Press the REPRO key corresponding to the channel to be played back, such that its key indicator lights.

3 Press the PLAY key.

Playback starts. You can monitor the sound being played back from a channel in playback signal monitoring status.

4 To stop playback, press the STOP key.

Playback ends.

Executing repeat playback

During playback, you can execute repeat playback between two points by pressing the REPEAT key.

1 Press the OPR MODE key, such that the NORMAL indicator appears in the display window.

2 To start playback, press the REPRO key, such that its key indicator lights, then press the PLAY key.

3 While monitoring the playback signal, press the REPEAT key at the point where you want to start repeat playback.

The repeat start point is stored, and "REPEAT I-" flashes in the display window.

4 Press the REPEAT key again at the point where you want to end repeat playback.

The repeat start and end points are stored, and the repeat indication changes to "REPEAT I-II" and lights steadily. Repeat playback between the two designated points starts.

5 To stop repeat playback, press the STOP key.

Playback ends.
The repeat indication in the display window disappears, and repeat playback is canceled.

4-3-2. Variable speed playback

You can execute variable speed playback at -12.5% to +12.5% normal playback speed in increments of 0.1% normal playback speed.

Setting the variable speed value

When not executing variable speed playback

1 Press the VARI SET key, such that its key indicator lights.

The stored variable speed value appears in the display window.

2 Set the desired variable speed value by rotating the search dial, or input the speed value by using 10 key pad.

3 Press the VARI SET key.

The designated variable speed value is stored as the speed for variable speed playback. The display window indication returns to its original status.

When executing variable speed playback

1 Press the VARI SET key, such that its key indicator lights.

The stored variable speed value appears in the display window.

2 Set the desired variable speed value by rotating the search dial, or input the speed value by using 10 key pad.

The Playback speed changes, as the displayed value changes.

3 Press the VARI SET key.

The set variable speed is stored as the speed for variable speed playback. The display window indication returns to its previous status.

Notes
• Set +/- sign last,after you input the variable speed value.

Executing variable speed playback

1 Press the VARI key, such that its key indicator lights.

2 Press the PLAY key.

Playback starts at the stored variable speed.

Notes
• When you use the variable speed function, set the dip switch No.15 (clock mode) of main unt to NORMAL.

4-3-3. Time Code Sync Playback

During playback, you can synchronize the playback time code sync phase or disc time code sync phase with an external composite video signal sync phase. To execute this function with playback time code, the optional DABK-9003 must be installed.

Setting time code sync playback

There are two time code sync playback modes, as follows.

ONCE: After initial synchronization with the external composite video signal sync phase is achieved, time code sync playback terminates. The unit returns to normal playback.

CONTINUE: After initial synchronization with the external composite video signal sync phase is achieved, the unit automatically executes re-synchronizing if any discrepancy between the external signal sync and the playback sync occurs, such that synchronization of the sync phase with the external composite video signal is maintained throughout the operation.

To select the time code sync playback mode, set DIP switch 4 on the PCM-9000 as necessary.

4-3. Playing Back in Normal Operation Mode

Executing time code sync playback

1 Set DIP switch 3 on the PCM-9000 to II.

2 Set DIP switch 15 on the PCM-9000 to I.

3 Press the SYNC CLOCK key, such that the VIDEO indicator lights.

4 Press the REPRO key of the TC (time code) channel, such that its indicator lights.

5 Press the PLAY key.

While the unit is synchronizing the playback sync phase with the external composite video sync phase, the PLAY key flashes.
Once synchronization has been achieved, the PLAY key stops flashing and instead lights steadily.

Note
You can select either the AAIP time code or recorded external time code as the playback time code to be output from the TIME CODE OUT connector of the DABK-9003.

4-3-4. Insertion Function

When the optional DABK-9007 is installed, the PCM-9000 supports an insertion function that enables signal output from the INSERTION SEND connector, thus enabling signal processing by the external effecter or mixer. The processed signal is returned to the input of the PCM-9000.

1 Press the INPUT SELECT key, such that the indicator corresponding to the desired signal lights.

2 Press the INSERTION key.

The INSERTION indicator appears in the display window.

3 To cancel the insertion, press the INSERTION key, such that the INSERTION indicator disappears.

Notes
- Insertion signals output from the INSERTION SEND connector and input to the INSERTION RETURN connector of the AES/EBU format.
- You cannot record signals being input to the insertion return connector.

4-4. Searching in Normal Operation Mode

This section explains how to locate to a point in normal operation mode. You can perform a search by using the jog/shuttle function (while monitoring the sound), by specifying a desired address, by using the MARK/LOCATE keys (using the time code address), or by performing a track/rec ID search (using the ⏮ or ⏭ keys) ,or inputting a locate address directly by using dial or 10 key pad. Use whichever method is appropriate.

4-4-1. Searching with the Jog/Shuttle

Shuttle mode lets you locate to a point roughly, while jog mode lets you locate to it precisely. With the optional DABK-9007 Memory Board installed, you can monitor sound continuously even in jog mode.

Searching in jog mode

Press the JOG key, such that its key indicator lights.

The unit enters jog mode. Subsequently, you can locate to a desired point in units of blocks (about 30 ms) by rotating the search dial.

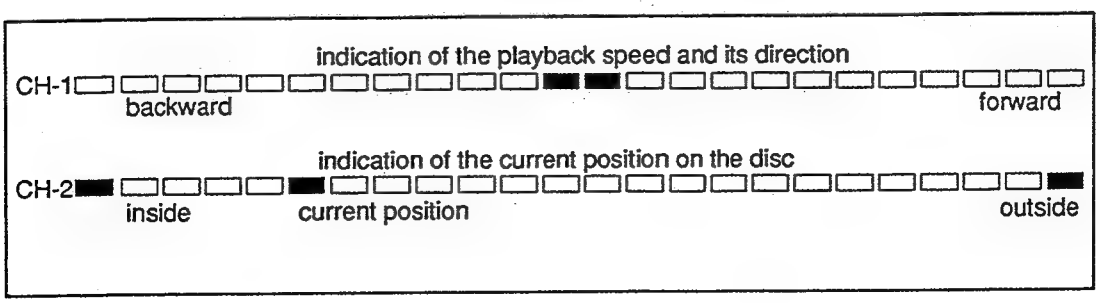
Releasing jog mode

Press the JOG key, such that its key indicator goes out.
Pressing any other disc transport key also releases jog mode.

Searching in shuttle mode

Press the SHUTTLE key, such that its key indicator lights.

The unit enters shuttle mode. The disc is played back at a speed corresponding to the angle of rotation of the search dial. The playback speed and address of the current position on the disc are displayed by the level meter.



Releasing shuttle mode

Press the SHUTTLE key, such that its key indicator goes out. Pressing any other disc transport keys also releases shuttle mode.

4-4-2. Searching for Specified Address

You can locate a desired time code address by using the search dial or the 10 key unit.

Searching with the search dial

1 Press the → key.

A flashing cursor appears at the seconds digit in the display window.

2 Press the ← or → key to position the cursor to the desired digit.

3 Rotate the search dial until the desired value appears.

4 Repeat steps 2 and 3 until you have set all the digits as required.

5 Press the LOCATE key.

The unit locates to the designated address.

Searching with the 10 key unit

1 Press the → key.

A flashing cursor appears at the seconds digit in the display window.

2 Press the ← or → key to position the cursor to the desired digit.

3 Input the desired value by using the 10 key unit in order of Hours, Minutes, Seconds, and frames.

4 Press the LOCATE key,

The unit locates the designated address.

Searching with the REC ID

Normaly the cursor indicates the entry position and REC ID NO. IS flashing. If the cursor is not in entry position.

1 Press the ← key.

A flashing cursor appears at the REC ID in the entry position in the display window.

2 By using dial or 10 key unit, input the REC ID No.directly in Enable OFF condition.

In this case, only REC ID No. is displayed but address is not displayed.

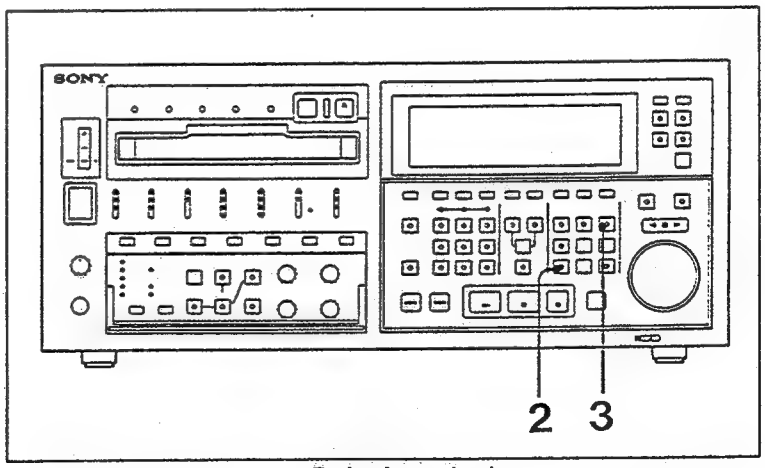
3 Press the LOCATE key, the unit locates to the designated position.

When you input No.00 for REC ID, the locate point is 00H00M00S00F.

4-4-3. Searching with MARK/BEGIN/END keys

You can store up to 99 mark points (point numbers 01 to 99) and locate a desired mark point by pressing the LOCATE key.

Registering mark point



Registering mark points

1 Locate to the point that you want to register as a mark point.

2 Press the ENABLE key, such that its key indicator lights.

3 Press the MARK key.

The displayed time code address is stored as a mark point. Each mark point is assigned a mark address number. Mark numbers are automatically assigned, in order, as the mark points are registered. You cannot assign a mark address number arbitrarily.
For resistering of Begins and Ends, see "5-2-1. Resistering Tracks".

Recalling a mark, begin, end point

1 While the ENABLE key indicator is not lit, press the MARK(BEGIN, END) key, such that its key indicator lights.

The mark(begin, end) point number and the most recently displayed time code address appear in the display window.

2 Rotate the search dial until the desired mark(begin, end) number or input the number by using 10 key unit, then the corresponding address appear.

3 After recalling a mark(begin,end) point, press the MARK (BEGIN,END) key, such that its key indicator goes out.

Note
If, in Step 3, you do not press the MARK(BEGIN,END) key, after a short pause the display will return to its previous status.

Locating a mark, begin, end point

1 While the ENABLE key indicator is not lit, press the MARK(BEGIN,END) key, such that its key indicator lights.

2 Rotate the search dial until the desired mark point number or input the number by using 10 key unit then its time code address appear.

3 Press the LOCATE key.

The LOCATE key lights, and the time code is located to the designated mark (begin,end) point.
Once the designated mark point has been located, the STOP key lights.

Note
When, in Step 2, you input the mark (begin,end) number by using 10 key unit, 2 digit figure must be inputted like 02 or17.
For modifying or deleting or remumbering the mark number,see "5-2-2~ 5-2-4, Modifying,Deleting, Renumbering Tracks/Marks"

4-4-4. Searching for Rec IDs

You can locate the in point of a rec ID, or the begin point of a track, by pressing the ⏮ or ⏭ keys. This searching method functions differently depending on the operation mode.
For details of tracks, see "5-1. What are Tracks and Files?".

1 Turn off the ENABLE, BEGIN, END and MARK key indicates

2 Press the ⏮ or ⏭ key.

The time code address of the nearest previous (or next) rec in point is located. The ⏮ (or ⏭) key lights while locating.
Once a time code has been located, playback starts automatically.

Note
You cannot search for a rec ID such as illustrated below.

In the normal operation mode, the display of entry REC ID does not change when you perform the next,previous operation.

When you press ⏮ key or ⏭ key many times in a short term, the next or previous command cannot be recognized untill locate operation is completed.

You cannot search the rec ID number 2 by using the ⏮ or ⏭ keys in monitor recording mode.

4-4-5. Locate to REC END/END SEARCH

PCM-9000 resisters REC IDs for each recording automaticaly,and the recording data (REC ID) can be stored onto the AUX DATA area of the disc.So, the serching for REC IDs is available.

Locate operation to the REC END

After completion of recording operation,the REC END ID is resistered automaticaly and "REC END" appeares on the ENTRY position of the display.In this event, if you do not perform the locate operation with REC ID,BEGIN,END,MARK points,this REC END point is memoried as one point memory.

1.Locate operation to the REC ID and recording operation In the SYNC REC MODE

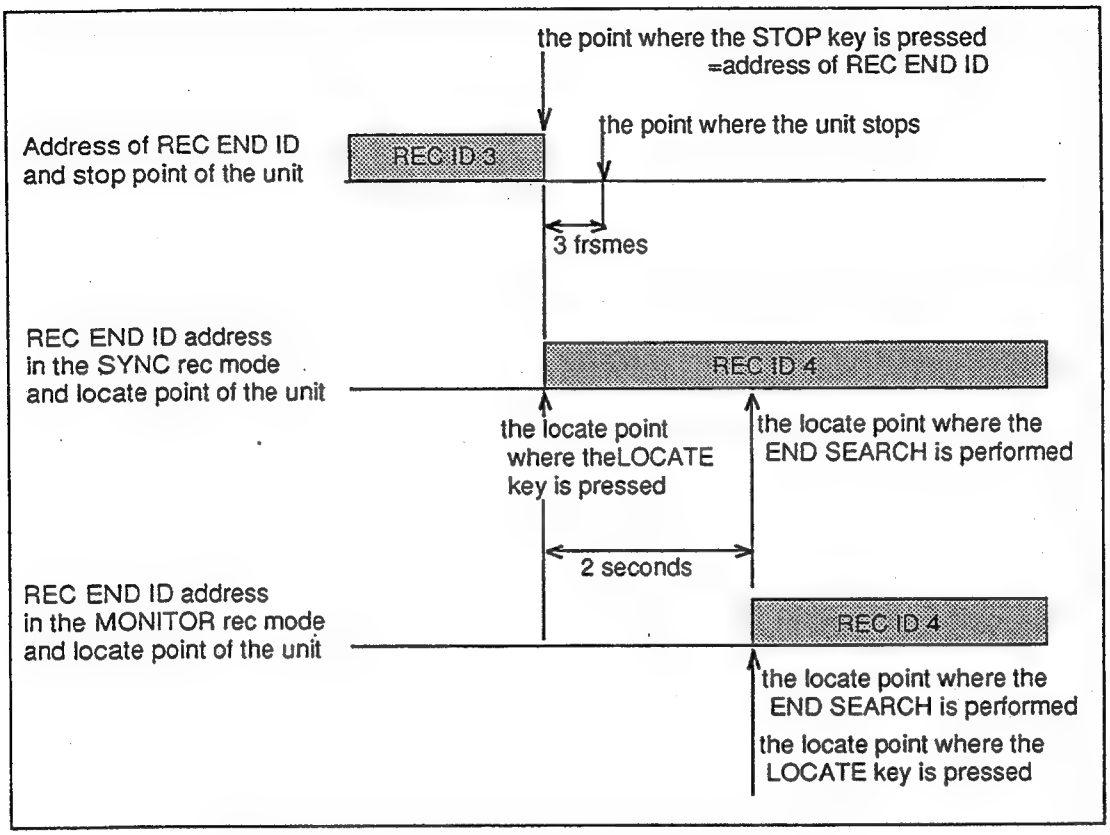
When you stop recording by pressing the STOP key in the sync recording mode,the disc stops after 3 frames over running.So the time data which is 3frames later than the actual STOP timing is displayed.In this event,if you press the LOCATE key,the unit locates 3frames back from displayed time.And if you start sync recording after this event,continuous digital data will be recorded from the REC END address as assemble recording.

2.Locate operation to the REC ID and recording operation In the monitor REC MODE

When you stop recording by pressing the STOP key in the monitor recording mode,the disc stops after 3 frames over running.So the time data which is 3frames later than the actual STOP timing is displayed.In this event,if you press the LOCATE key,the unit locates 2seconds -3 frames forward from displayed time.Because of monitor recording mode, the digital data will be discontinuous by stop operation.In the monitor recording operation,2seconds space is necessary between recordings.So the mute space is inserted automaticaly.

REC END SEARCH

REC END SERCH function is used when the new recording on an unrecorded portion is performed after some recording.When you press the ENDSEARCH key,the unit locates 2 seconds later from the phisicaly last recording end point in any recording mode.



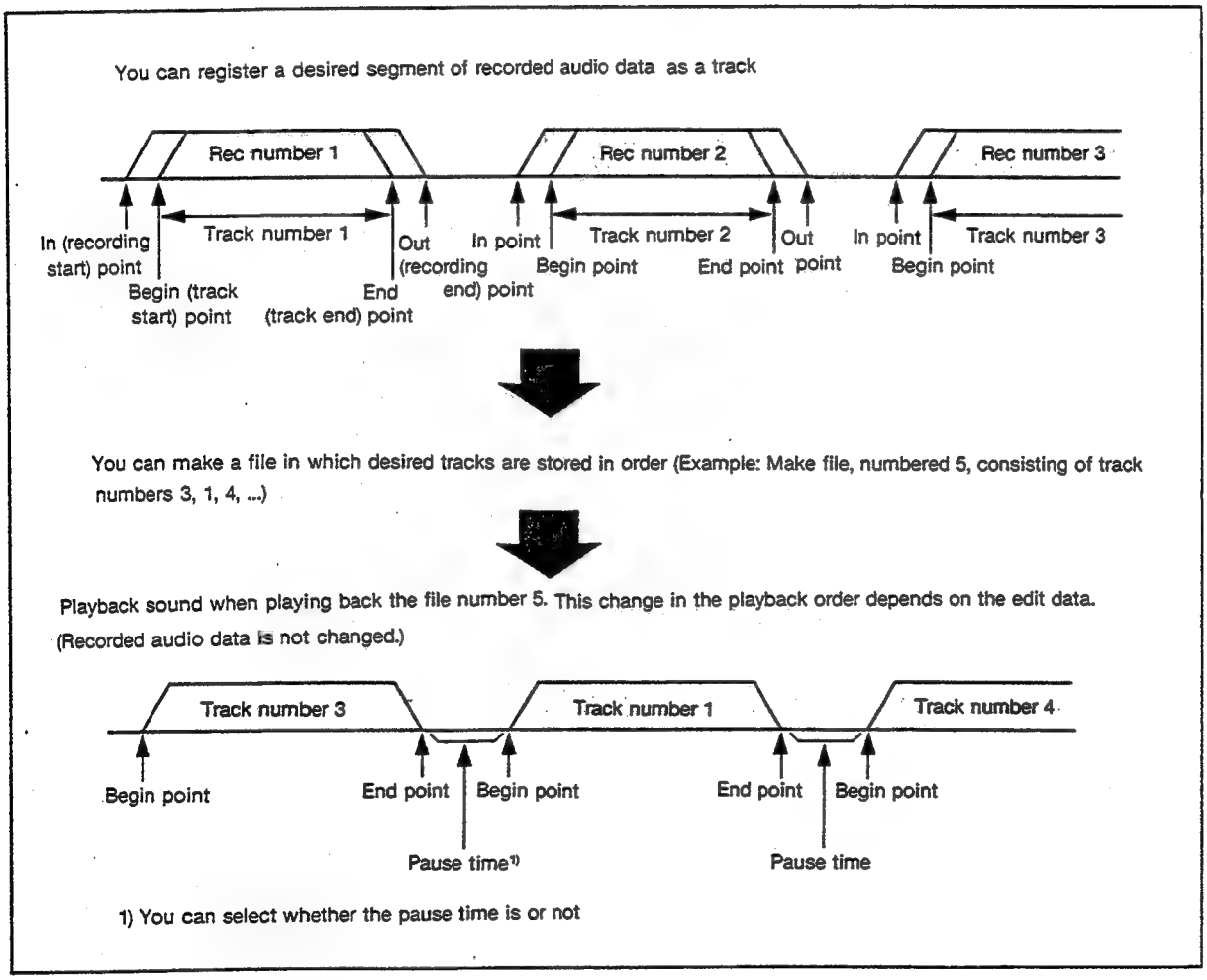
REC END ID address and LOCATE point,END SERCH point

Chapter 5
Program Editing

This chapter explains the main function of the PCM-9000; program editing. The explanations of program editing include making tracks and files, saving edit data, copying files, and so on.

5-1. What are Tracks and Files?

You can register a desired segment of audio data as a track by designating two points (the track begin and end points). A track is handled as a single unit in the disc operation mode. You can also make a file in which tracks are stored in a desired order.
Making tracks and files does not affect the audio data, because the registration data for tracks and files is recorded to the edit data recording area. You can perform saving or deletion of only this edit data.



Tracks and files

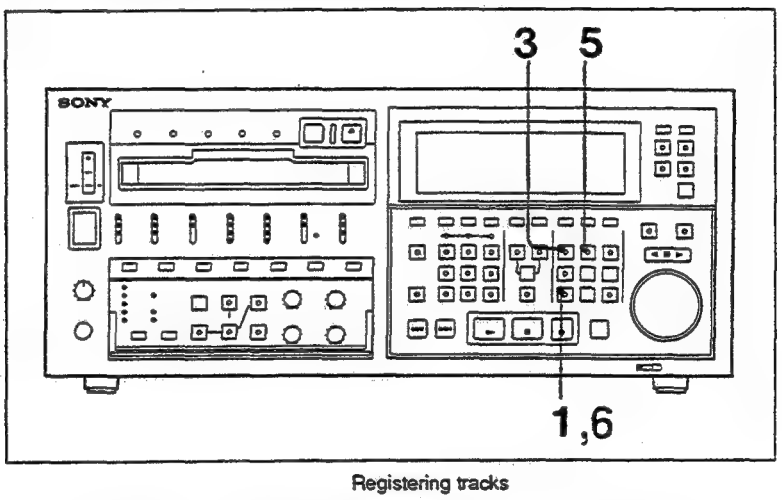
Pause time (2 seconds) can be inserted and deleted.

5-2. Making Tracks

You can edit recorded audio data, while not affecting the recorded audio data itself, by using tracks and files. This section explains how to make tracks.
Tracks can be made only in normal operation mode.
Begin and End points can be resistered up to 99 each.

5-2-1. Registering Tracks

To register a track, you must register two points: a begin (track start) point and end (track end) point.
Register a track by following the procedure below:



Registering tracks

Begin and End points can be resisterd on the fly during recording and playbacking.

1 Press the ENABLE key, such that its key indicator lights.

2 Press the BEGIN key, such that its key indicator lights.

The indicated time code address is registered as the begin point. The track number flashes in the entry ID display area of the display window.Track numbers are asigned automaticaly.

3 Press the END key, such that its indicator lights.

The indicated time code address is registered as the end point. The "TRACK" and "END" indicators light and track number indication stops flashing, instead lighting steadily. Track numbers are automatically assigned in the order in which tracks are registered.

4 Press the ENABLE key, such that its key indicator goes out.

Registering a single point as both an end point and the begin point of the next track

In Step 4, above, press the BEGIN key instead of the END key.

The time code address, indicated when the BEGIN key is pressed, is registered as the end point.
At the same time, the indicated time code address is registered as the begin point of the next track. The track number flashes.

For details of modifying or deleting tracks, see "5-2-2.Modifying Tracks and Marks","5-2-3.Deleting Tracks and Marks".

Notes
The track length must be longer than 2 seconds.
You cannot resister the begin point before starting a recording.

Registering tracks by using the search dial

When registering tracks, you can enter the desired time code address by using the search dial.

1. Press the ENABLE key, such that its key indicator lights.
2. Press the → key, such that a flashing cursor appears at the seconds digit of the displayed current time code address.
3. Rotate the search dial until the desired value appears.
4. Press LOCATE key.
5. Press the BEGIN (or END) key.

   The designated time code address is registered as the track begin (or end) point.

Registering tracks by using the 10 key unit

When registering tracks, you can designate the desired time code address by using the search dial.

1. Press the ENABLE key, such that its key indicator lights.
2. Press the → key so that the cursor moves to the digit of seconds of the displayed current time code address.
3. Input the desired value by using the 10 key unit.
4. Perform the same prosedure (4,5) as using the serch dial.

Recalling a registered begin/end point

A registered begin or end point time code address can be recalled and displayed in the display window.

1 While the ENABLE key indicator is not lit, press the BEGIN or END key, such that its key indicator lights.

The track number in the entry position is flashing.This means the cursor is in the entry position.

The most recently displayed track number and its time code indication appear in the display window.
About 1 second after showing the resistered BEGIN/END time, the display reverts to current time.

2 Rotate the search dial, such that the desired track number and begin or end point appear in the display window, or input the desired track number directly by using the 10 key unit.

The time data of the track ID apppears in the display window for a moment.
About 1 second after showing the resistered BEGIN/END time, the display reverts to current time.

3 Press the BEGIN or END key such that its key indicator goes out.

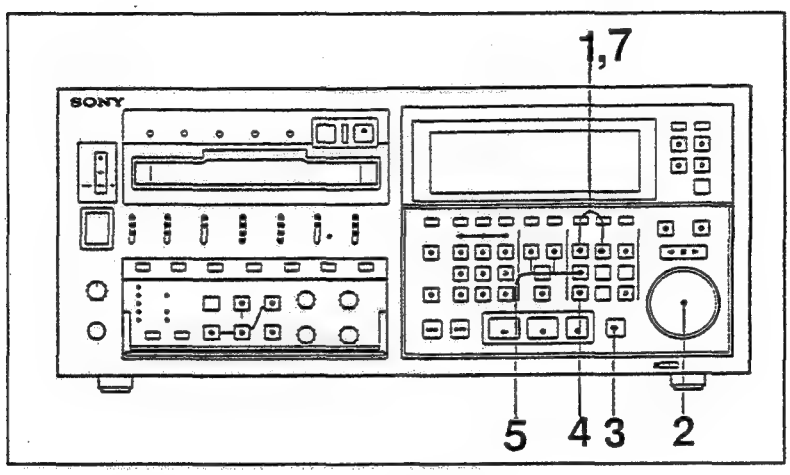
Locating a recalled begin/end point

Press the LOCATE key while the track number appear in the display window.

The LOCATE key lights and the indicated begin/end point time code address is located.
The LOCATE key goes out once the desired time code address has been located.

5-2-2. Modifying Tracks and Marks

You can modify a begin, end or mark point, then register it again.



Modifying tracks

1 While the ENABLE key indicator is not lit, press the BEGIN , END or MARK key, such that its key indicator lights.

2 Rotate the search dial, such that the desired begin or end point address appears and track number, or input the desired track number directly by using the 10 key unit.

3 Press the LOCATE key.

The LOCATE key lights and the specified begin, end or mark point is located.

4 Press the ENABLE key, such that its key indicator lights.

5 Press the MODIFY key.

The BEGIN, END or MARK key indicator flashes.

At this step when you press ENABLE or MODIFY key, modification mode is canceled and LED turns off.

6 Locate the desired time code address as a new begin or end point, or input the desired time code address, directly by using the 10 key unit.

7 Press the BEGIN, END or MARK key.

The begin, end or mark point is modified to the indicated time code address.

5-2-3. Deleting Tracks and Marks

You can delete a registered track mark. Deleting a track and mark consists simply of deleting the registered track (begin, end), mark point data. Deleting a track or mark does not affect the audio data recorded onto the disc.

1 While the ENABLE key indicator is not lit, press the BEGIN, END or MARK key such that its key indicator lights.

2 Rotate the search dial, such that the track number to be deleted appears, or input the track number directly by using 10 key unit.

3 Press the ENABLE key, such that its key indicator lights.

The BEGIN, END or MARK key indicator flashes.

4 Press the DELETE key.

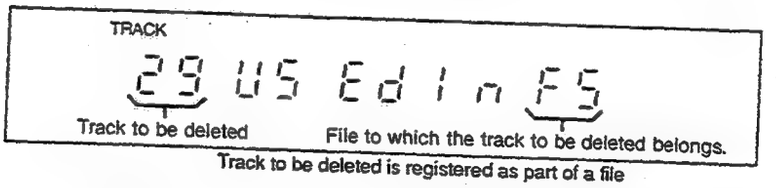
"DELETE" appears in the display window.

5 To delete the track or mark, press the BEGIN, END or MARK key.

The designated track is deleted.

Note

When the track to be deleted is registered as part of a file, the following appears in the display window.



Track to be deleted is registered as part of a file

When you do not want to delete, press ENABLE key.Then key indicator goes out

5-2-4. Renumbering Tracks and Marks

As track or mark numbers are assigned automatically, you cannot assign an arbitrary number to a track or mark. You can, however, renumber all the tracks or marks recorded on a disc, in order of their AAIP addresses.

1 While the ENABLE key indicator is not lit, press the BEGIN, END or MARK key, such that its key indicator lights.

2 Press the ENABLE key, such that its key indicator lights.

The BEGIN, END or MARK key flashes.

3 Press the RENUMBER key.

"RENO" appears in the display window.

4 To renumber tracks, press the BEGIN, END or MARK key.

All tracks or marks are renumbered, in the order of their AAIP addresses from 1. If some of the tracks to be renumbered are registered a file, the track numbers in that file are also renumbered accordingly.

5-2-5. Playing Back in Disc Operation Mode

The PCM-9000 supports the various playback in disc operation mode. Disc operation mode is for playback only. In disc operation mode, the BEGIN key indicator automatically lights and the unit enters track playback mode. When the unit gose into the disc mode,the smallest track is recalled, and the unit locates to that point.

Track begin point playback

1 Press the OPR MODE key, such that the DISC indicator appears in the display window.

The unit enters disc operation mode.

2 Press the BEGIN key, such that its key indicator lights.

3 Rotate the search dial, such that the desired track number appears, or input the desired track number directly by using the 10 key unit.

4 Press the LOCATE key.

The unit locates the displayed track begin point.

5 Press the PLAY key.

Playback starts. After playing back the specified track, the unit automatically locates the same track begin point, then stops.

Track end point playback

1 Press the OPR MODE key, such that the DISC indicator appears in the display window.

The unit enters disc operation mode.

2 Press the END key, such that its key indicator lights.

3 Rotate the search dial, such that the desired track number appears, or input the desired track number directly by using the 10 key unit.

4 Press the LOCATE key.

The unit locates to a point about 8 seconds ahead of the displayed track end point address. When the track is shorter than 8 seconds the locate point is top of the track.

5 Press the PLAY key.

Playback starts. After playing back the specified track, the unit automatically locates to a 8 point seconds ahead of the same track end point address as now playbacked, then stops.

Track mark point playback

1 Press the OPR MODE key, such that the DISC indicator appears in the display window.

The unit enters disc operation mode.

2 Press the BEGIN or END key, such that its key indicator lights.

3 Rotate the search dial, such that the desired track number appears, or input the desired track number directly by using the 10 key unit.

4 Press the LOCATE key.

5 Press the MARK key.

6 Rotate the search dial, such that the desired mark number appears, or input the desired mark number directly by using the 10 key unit.
You can specify a mark point in the track specified in step 3.

7 Press the LOCATE key.

The unit locates the specified mark point address.

8 Press the PLAY key.

Playback starts. After playing back from the mark point to the track end point, the unit automatically locates the same mark point address, then stops.

Function of the ⏮ (previous) and ⏭ (next) keys in disc operation mode

In disc operation mode, the function of the ⏮ and ⏭ keys differs from that in normal operation mode.

During track begin point playback

Pressing the ⏮ key locates the playingback track begin point, then resumes playback.
Pressing the ⏭ key locates the next track begin point, then resumes playback.

During track end point playback

Pressing the ⏮ key locates to a point 8 seconds ahead of the playingback track end point, then resumes playback.
Pressing the ⏭ key locates to a point 8 seconds ahead of the next track end point, then resumes playback.

During track mark point playback

Pressing the ⏮ key locates the previous mark point, then resumes playback.
Pressing the ⏭ key locates the next mark point, then resumes playback.

Note
When using the ⏮ and ⏭ keys during track mark point playback, "previous" and "next" simply means the previous or next time code address, rather than mark point number.

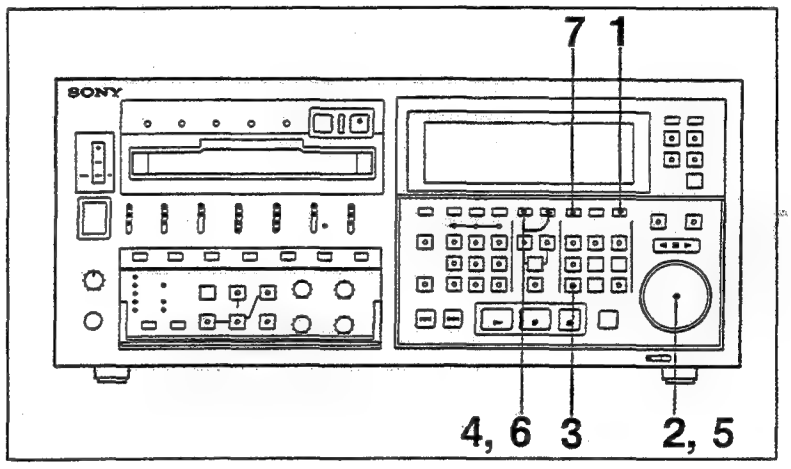
hen you press next previous key many times in a short term, these command cannot be recognized until the locate operation is completed.

5-3. Making Files

By using tracks and files, you can edit recorded audio data without affecting the recorded audio data itself. This section explains how to make and delete files.File can be resistered up to 9.

5-3-1. Making a File

Registering a file



Registering a file

1 Press the OPR MODE key, such that the FILE indicator appears in the display window.

File number 1 appears in the entry ID display area, and the tracks registered as contents of the corresponding file and total number of files appear in the display window. If no tracks are registered for the displayed file, no track numbers are displayed.

2 Rotate the search dial until the desired file number appears, or input the desired file number directly by using the 10 key unit.

3 Press the ENABLE key, such that its key indicator lights.

4 Press the ← or → key to move the cursor to the current display area.

5 Rotate the search dial to designate the value desired as the track number, or input the value directly by using the 10 key unit.

6 Press the → key to move the cursor to the next track number. To correct a previously set track number, press the ← key to move the cursor to the track number to be corrected.

Repeat steps 5 and 6 until you have designated all the track numbers to be registered.

7 Press the SET key.

The designated file and tracks are registered as a new file.

Notes
- The file length must be less than 24 hours.
- If you press the SET UP key or system control keys (PLAY, LOCATE etc.) before you press the SET key, enable function is disabled, and file datas which are during resistering are cleared.

Copying a file to a file with a different file number

You can copy a file to a file having a different file number.

1 Recall the file to be copied.
For details, see "5-3-1 Registering a file" .

2 Press the ENABLE key, such that its indicator lights.

3 Position the cursor to the file number indication, then rotate the search dial to designate the value desired as the file number, or input the value directly by using the 10 key unit.

4 Press the SET key.

The file is copied with the designated file number. The contents of the original file remain as is.
If the specified file number is already in use, the contents of the file are re-registered to the new one.

Note
- If you press the SET UP key or system control keys (PLAY,LOCATE etc.) before you press the SET key, enable function is disabled, ane copying is canceled.
- The offset value is not copied.

Modifying a file

The following types of file modification are supported.
- Changing a track in a file.
- Deleting a track or a pause from a file.
- Inserting a track or a pause into a file.

To modify a file, follow the procedure below:

1 Recall the file to be modified.
For details, see "5-3-1 Registering a file" .

2 Press the ENABLE key, such that its indicator lights.

3 **To change a track number**
(1) Press the ← or → key to move the cursor to the track number that you want to change.
(2) By rotating the search dial, or by using the 10 key unit, input a value for the new track number.
(3) Go to step **4**

To delete a track or pause
(1) Press the ← or → key to move the cursor to the point you want to delete.
(2) Press the DELETE key.
(3) Go to step **4**

To insert a pause (duration is 2 seconds)
(1) Press the ← or → key to move the cursor to the point (between two tracks) where you want to insert a pause.
(2) Press the INSERT key.
"-" appears at the designated point.
(3) Go to step **4**

To insert a track
(1) Press the ← or → key to move the cursor to where you want to insert a new track.
(2) Press the INSERT key.
smallest track number appears at the designated point. All the previously displayed tracks move to the right.
(3) By rotating the search dial, or by using the 10 key unit, input a value for the new track number.

4 Press the SET key.

The modified file is registered.

To cancel inserting/deleting of a track or pause

Before completing step 4 in the above procedure, press the ENABLE key, such that its indicator goes out.

Notes

- When you pressINSERT key at the pause time,the cursor just move to the next track.
- When you select "no pause time",actualy there is about 0.1 second duration between two tracks.And also playing time and remaining time display includes these durations.
- If you press the SET UP key or system control keys (PLAY,LOCATE etc.) before you press the SET key, enable function is disabled, and file datas which are during modifying are cleared.

5-3-2. Deleting a File

You can delete a registered file. To delete a file, follow the procedure below.

1 Press the OPR MODE key, such that the FILE indicator appears in the display window.
File number 1 appears in the entry ID display area, and the tracks registered as the contents of the corresponding file, as well as the total number of tracks in the file, appear in the display window.

2 Rotate the search dial until the file number corresponding to the file to be deleted appears, or input the number directly by using the 10 key unit.

3 Press the ENABLE key, such that its indicator lights.

4 Press the DELETE key.

5 Press the SET key.

The designated file is deleted.

Note
If you press the SET UP key or system control keys (PLAY,LOCATE etc.) before you press the SET key, enable function is disabled, and deleting is canceled.

5-4. Playing Back a File

This section explains how to play back a registered file. Repeat playback and variable speed playback are also supported.

Playing back a file

1 Press the OPR MODE key, such that the FILE indicator appears in the display window.

File number 1 appears in the entry ID display area, and the tracks registered as the contents of the corresponding file, as well as the total number of files, appear in the display window.

2 Rotate the search dial until the playback file number appears, or input the number directly by using the 10 key unit.

3 Press the PLAY key.

File playback starts.

Playing back a specified track

1 Press the OPR MODE key, such that the FILE indicator appears in the display window.

2 Rotate the search dial until the playback file number appears, or input the number directly by using the 10 key unit.

3 Press the → key, such that the cursor moves to the desired track indication.

The unit automatically locates the specified track begin point.

4 Press the PLAY key.

Playback starts from the specified track, in the registered file order.

5-4. Playing Back a File

Function of the ⏮ (previous) and ⏭ (next) keys during file playback

In file operation mode, the ⏮ and ⏭ keys function in basically the same way as in disc operation mode.

Though you can locate or specify any registered track in disc operation mode, in file operation mode you can locate or specify any tracks in a specified file.

In the disc mode when you press ⏮ key during playing back a track,the unit locates to the begin point of the track which is played back now.On the other side,in the file mode the unit locates to the begin point of the previous track.

Function of the cursor keys during file playback

When the unit enters file operation mode, the cursor is positioned to the entry ID display area. Once file playback starts, the cursor moves to the number of the track being played back.

To move the cursor to the entry ID display area

1 Hold down the → key until the cursor is positioned to the first track indication of the file.

2 Release the → key, then press the → key again.

The cursor moves to the entry ID display area.

Playback after cuesol moves to other track

1 When ENABLE key lights.
After cursor moves,press LOCATE key.
Press PLAY key,playback starts from the designated track.

2 When ENABLE key dose not light.
Locate operation is performed automaticaly,according to the cusor move.
Press PLAY key, playback starts from the designated track.

Function of the JOG/SHUTTLE function during file playback

JOG and SHUTTLE operation during playing back a file in available only inside of the track which is playing back.When you want to change the track,you escape from jog or shuttle operation by pressing the STOP key,then you change the track by using ← or → key.Or you change the track by performing playing back operation.
When you press the JOG/SHUTTLE key during the pause time,the unit locates to the next track and enter the jog/shuttle operation.

5-5. Saving the Edit Data

As edit data is merely registered in the internal RAM (Random Access Memory) of the PCM-9000, it will be lost if it is not saved to disc before turning off the system power. Be sure to save all editing data to disc before turning off the power.

The data to be saved is as follows:
- Track data (begin points, end points, track numbers)
- File data (file and numbers and file contents)
- Mark point data
- Rec ID data
- TC offset

1 Press the ENABLE key, such that its indicator lights. Press the DATA SAVE key on the RM-D9000.

2 Or press the EDIT DATA SAVE key on the PCM-9000.

"SAVE" appears in the display window, and the DATA SAVE and EDIT DATA SAVE key indicators light. The indicators of the DATA SAVE key and the EDIT DATA SAVE key go out once data has been saved to the disc. In this event the unit locates to the top of the file automatically.

Notes
- Once you start to save data to disc, you cannot cancel saving.
- The JOG, SHUTTLE, disc transport and editing keys are all disabled while data is being saved to disc.
- In the disc operation mode, use EDIT DATA SAVE key of PCM-9000 main unit for saving the edit data.

When the REC PROTECT switch on the disc is set to MAIN/EDIT DATA.

When the REC PROTECT switch on the disc is set to MAIN/EDIT DATA, you cannot save edit data to that disc. Press the EJECT key to eject the disc, then set the REC PROTECT tab to its leftmost position (recording ready status). Then, insert the disc again and execute the data save procedure.
For details of the write protection switch, see "3-4-4. Preventing Accidental Erasure"

When a different disc is inserted for saving data

When data is recorded to a disc for the first time, the PCM-9000 automatically records recognition codes to that disc, enabling it to know how many times editing data has been saved to that disc. This data is rewritten whenever data is saved. These recognition codes are assigned automatically. The user cannot assign a code arbitrarily.

5-6. Copying a Program

With the optional DABK-9005 Interface Board installed, you can copy the data in a program file or track on one PCM-9000 to another PCM-9000, connected through the SCSI interface, at two times normal playback speed.
PCM-9000 can be connected through SCSI interface up to 8 machines each other.
In the following explanation, "player" refers to the source machine, while "recorder" refers to the target machine.

Preparing for file copying

1 On the player, assign the SCSI ID by setting the ADDRESS switch on the DABK-9005 to 6 or 7.

2 On the recorder(s), assign the SCSI ID by setting each ADDRESS switch on the DABK-9005 units to between 1 and 5.

3 Press REC MODE key on the recorder(s), such that the MONITOR indicator lights.

4 Press the REC READY key on the recorder(s), such that the indicator lights.

Notes
- When copying, the unit with the larger SCSI ID is used as the player (master unit) and that with the smaller SCSI ID is used as the recorder (slave unit).
- Do not assign same the SCSI ID to different PCM-9000 units in copying system. Doing so will cause a malfunction.

Copying an entire disc

You can copy the entire controls of a disc to up to seven PCM-9000 units simultaneously.

1 Insert the master disc into the player.

2 Press the OPR MODE key on the player, such that the COPY indicator appears in the display window.

At this step,file"o" appears in the entry ID display.
This means "entire disc copy".

3 Insert a new or erased disc into the recorder(s).

The SCSI ID corresponding to the recorder which is ready to copy appears in the player's display window.

4 Press the PLAY key on the player.

Copying starts.

5 Press the OPR MODE key, such that the desired operation mode indicator lights.The copy mode is disabled.

Notes

- When copying an entire disc, you must use a new or totally erased disc. If a disc containing data is inserted into the one of the recorders, the corresponding SCSI ID indicator of the player flashes and copying cannot executed.
- You can stop copying at any time by pressing the STOP key. The discs cannot be played back in this case, however.

Copying a file

When copying a file, you can copy a file to up to seven PCM-9000 units simultaneously.

1 Insert the master disc into the player.

2 Press the OPR MODE key on the player, such that the COPY indicator appears in the display window.

At this step,file"o" appears in the entry ID display. This means "entire disc copy".

3 Rotate the search dial until the number of the file you want to copy appears, or input the number directly by using the 10 key unit.

4 Insert a new or erased disc into the recorder(s).

5 Set the rec start point of the disc in the recorder.

The SCSI ID corresponding to the recorder which is ready to copy appears in the display window of the player.

5 Press the PLAY key on the player.

Copying starts.

6 Press the OPR MODE key, such that the desired operation mode indicator lights.The copy mode is disabled.

Notes

- If the disc inserted into the recorder does not have free space, the corresponding SCSI ID indicator flashes on the player and copying will not be executed.
- You can stop copying at any time by pressing the STOP key. The target discs cannot be played back in this case, however.

Chapter 6
Time Code Chase

This chapter explains the time code chase function. Included are an overview, as well as details of setting and executing. To execute the time code chase, the optional DABK-9003 must be installed.

6-1. Overview of Time Code Chase

The time code chase function is a synchronization function whereby a fixed sync offset is maintained between the playback time code and an external time code. To execute time code chase, the optional DABK-9003 must be installed.

Chase mode

During time code chase, the unit is locked to the external time code in units of ±1 sub-frame (1/100 frame). Both the AAIP time code and recorded external time code can be used as the basis for time code chase.
This function has the following two modes.

Address mode

After initial synchronization with an external time code is achieved, if the discrepancy between the external time code and the playback time code exceeds a predetermined amount, the signals are re-synchronized, such that synchronization with the external time code is maintained throughout the operation. Even if the external time code playback speed is varied, provided the variation is within +–10.0% of normal playback speed, synchronization is maintained.

- This mode should be used when an external time code can be supplied continuously and with no defects or errors.
- A feature of this mode is three operation windows, used to specify the error range outside of which re-synchronization is carried out, the variation range for vari-speed playback with synchronization, and so on.

For details, see "6-2-2. Time Code Chase Operation Windows".

Free mode

After initial synchronization with the external time code is achieved, time code chase terminates. The unit returns to normal playback synchronizing with the reference signal. This mode should be used when the external time code is prone to discontinuities or errors.
For example, when synchronizing the slave and master units to an external reference video signal and carrying out time code chase in free mode, once the slave unit and master unit time codes have been synchronized, even if the master unit time code contains discontinuities, synchronization is maintained by the reference video signal.

These two modes provide different functions, as listed in the following table.

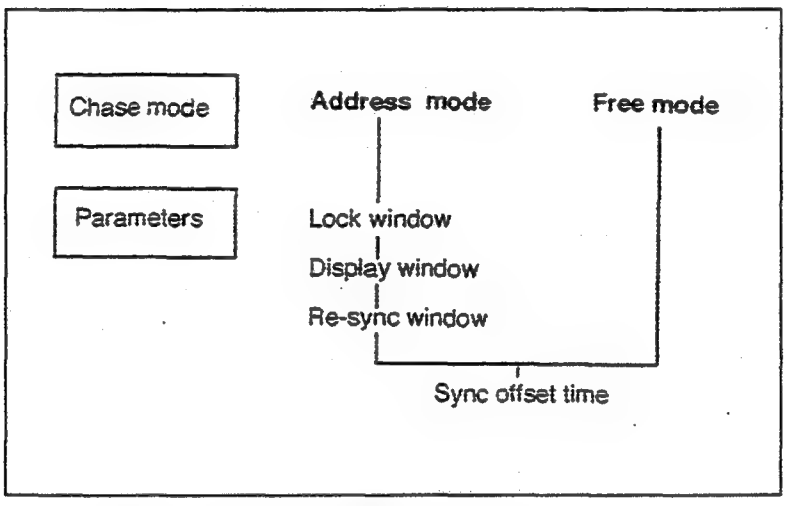
Differences between address and free modes

1a	1b	1c	1d
2a	2b	2c	2d
3a	3b	3c	3d
4a	4b	4c	4d
5a	5b	5c	5d
6a	6b	6c	6d
7a	7b	7c	7d
8a	8b	8c	8d

a) *For details, see "6-2-2. Time Code Chase Operation Windows".*
b) After synchronizing with an external time code, the slave unit is kept synchronized by the word sync signal supplied from the master unit.

6-2. Setting for Time Code Chase

Before executing time code chase, you must set the necessary parameters with the setting window. To enter each of the setting menus, press the SETUP key to display the corresponding menu.
By repeatedly pressing the SETUP key, the setting menu changes as follows:



Normal indication →Chase mode menu →Lock window setting menu →Display window setting menu →Re-sync window setting menu →Offset time setting menu →Offset error display mode →Normal indication → ...

6-2-1. Selecting Chase Mode

1 the display window.

2 Rotate the search dial to set the desired chase mode ("ADDRESS" or "FREE").

3 Press the SET key.

Chase mode is set to the designated mode.

6-2-2. Time Code Chase Operation Windows

In address mode, time code chase is based on three operation windows, used to specify the error range outside of which re-synchronization is carried out, the variation range for variable speed playback synchronizing with a reference video signal, and so on.

You can set each of three time code chase operation windows at any point during the operation. Note that, although you can set these windows in free mode, the settings so made have no effect. These settings are not saved by the memory back up function.

Lock window

If the discrepancy between the playback time code and the external time code exceeds the setting made with this window, re-synchronization begins.
Setting range: 1 to 99 subframes
Default setting: 1 subframe

Display window

If the discrepancy between the playback time code and the external time code exceeds the setting made with this window, the PLAY key flashes to alert the user to re-synchronization.
Setting range: 1 to 99 subframes
Default setting: 2 subframes

You cannnot set the display window value to a value smaller than the value set for the lock window.

Re-sync window

This window setting determines the range of variation in the playback speed for variable speed playback during re-synchronization.
Setting range: 0.2% to 12.5% (in 0.1% units)
Default setting: 12.5%

- **When the window setting is narrow:** Re-synchronization varies the playback speed only slightly in vari-sync playback. This requires a greater time to achieve synchronization, but the variations in pitch are not so apparent. This technique is referred to as slow re-sync. This setting should be used when using an analog tape recorder as the master unit.
- **When the window setting is wide:** Re-synchronization uses wide variations in the playback speed for vari-sync playback. This reduces the time required to achieve synchronization, but variations in pitch may be noticeable. This setting should be used to chase variable speed playback performed by a digital tape recorder as the master unit.

Setting lock/display/re-sync window

1 Press the SETUP key, such that the lock window/display/re-sync setting menu ("LOCK", "DISPLAY", or "RE-SYNC") appears in the display window.

2 Rotate the search dial to designate a lock/display/re-sync window value, or input the desired value directly by using the 10 key unit.

3 Press the SET key.

The designated value is registered as the lock/display/re-sync window value. The lock/display/re-sync window value indication appears.

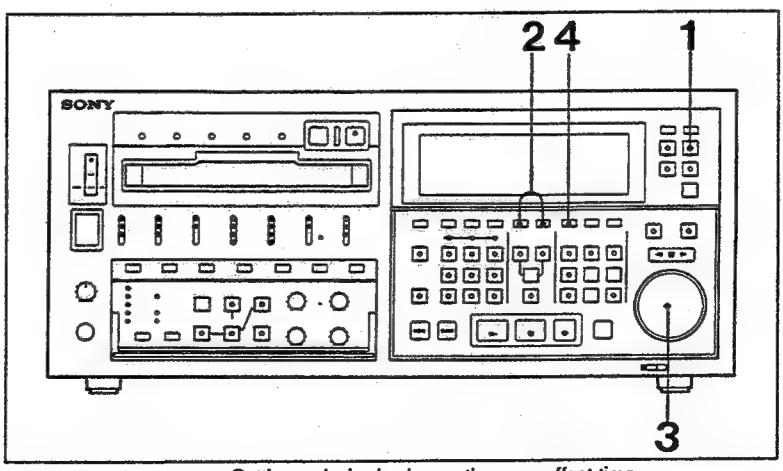
Recalling the lock/display/re-sync window value
Press the SETUP key, such that the lock/display/re-sync window setting menu appears in the display window.

6-2-3. Setting the Sync Offset Time

The sync offset time value, which is difference between the external time code and the time code of the PCM-9000, must be set before executing time code chase.
There are two ways of setting the sync-offset time, as follows:

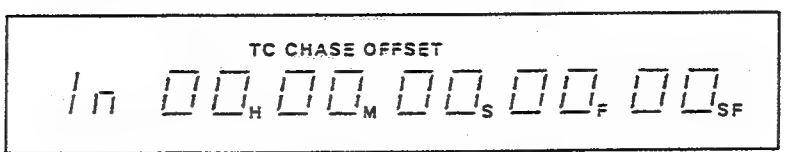
- Setting a desired value as the sync offset time
- Automatically setting the difference between the external input time code and the internal time code as the sync offset time

Setting a desired value as the sync offset time



Setting a desired value as the sync offset time

1 Press the SETUP key, such that the sync offset time setting menu appears in the display window.



Sync offset time setting menu

2 Press the ← or the → key to move the cursor to the digit you want to set.

As the cursor moves, the digit to which the cursor is located flashes.
The cursor moves in units of hours, minutes, seconds and frames.

3 Rotate the search dial to designate a sync offset time, or input the desired value directly by using the 10 key unit.

4 Press the SET key.

The sync offset time is registered.

Note
Instead of steps 3 and 4, you can also hold down the SET key and rotate the search dial.

Setting the difference between the external input time code and internal time code as the sync offset time

1 Press the SETUP key, such that the sync offset time setting menu appears in the display window.

2 Press the ← or → key to flash the all time indication.

"IN", and the time code value (the sync offset time) that is the difference between the external input time code and the internal time code, flash.

3 Press the SET key.

The sync offset time is registered, and the sync offset stops flashing and instead lights steadily.

Recalling the sync offset time

Press the SETUP key, such that the sync offset time setting menu appears.

6-2. Setting for Time Code Chase

6-2-4. Setting the Mode and Parameters

Before executing time code chase, you must select the reference signal, time code format, and so on.

According to the external input signal, set the following.

- Time code format: TC FORMAT key
- Generator mode: GEN MODE key
- Reference signal: SYNC CLOCK key

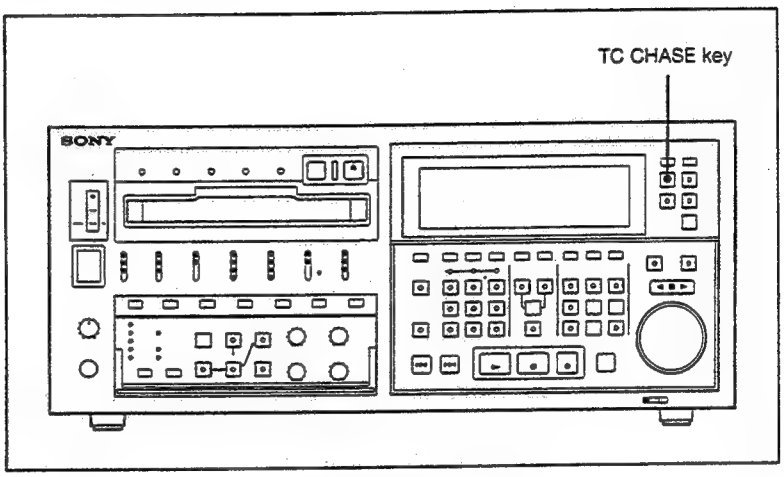
For details of making these settings, see "Chapter 2 Location and Functions of Parts and Controls".

6-3. Executing Time Code Chase

Before executing time code chase, set up the system as described in "6-2. Setting for Time Code Chase".

6-3-1. Playback with Time Code Chase

To execute playback with time code chase, follow the procedure below.



Executing time code chase

1 Start playback on the external master machine, or input the external time code signal to the PCM-9000.

2 Check that the slave PCM-9000 is stationary then press the TC CHASE key, such that its indicator lights.

Time code chase is executed, and the unit of disc time indication changes from frames to sub-frames.
Once synchronization has been completed, the TC CHASE indicator in the display window lights.

Note

All disc transport keys, except for STOP, PLAY and REC are disabled during time code chase.

Canceling time code chase

Press the TC CHASE key, such that its indicator goes out. Or, press the STOP key.
The disc transport stops, the TC CHASE key goes out and the STOP key lights.
The minimum unit of disc time indication changes to frames.

6-3. Executing Time Code Chase

Pausing time code chase (in the address mode)

Stop playback or recording with the master machine, or stop inputting the time code to the PCM-9000.
When the master machine stops, the slave machine (PCM-9000) also stops.

Confirming the offset error

Press the SETUP key, such that the offset error display appears in the display window. The unit of disc time indication changes to sub-frames.

6-3-2. Recording with Time Code Chase

To record with time code chase, perform the following steps in time code chase mode.

1 Check that the TC CHASE indicator in the display window appears.

2 While holding down the REC key, press the PLAY key.

Recording starts, with the units synchronized to the external time code.

If you press the FF, REW or STOP keys of master machine during recording with time code chase, recording is canceled, and the unit starts locating. Upon achieving synchronization with the external time code, the unit starts playback with time code chase.

Canceling recording without pausing time code chase

Press the PLAY key while recording with time code chase.

Recording ends, and the unit starts playing back.

6-3-3. Automatic Punch-In/Out during Time Code Chase

You can execute automatic punch-in/out during time code chase. This function is useful when recording a desired sequence of audio data from external equipment onto the disc.

1 Set the desired chase mode, window value, and offset value.

2 Press the REC MODE key, such that the SYNC indicator lights.

3 Press the REPRO key corresponding to the channels for which you want to execute automatic punch-in/out.

4 Register the in and out points.
For details, see "4-2-6.Automatic punch in/out".

5 On the master unit, start playback.

6 While the PCM-9000 is stationary, press the TC CHASE key, such that its indicator lights.

7 Press the REC READY key corresponding to the channels for which you want to execute automatic punch-in/out.

8 While the IN and OUT key indicators are lit, hold down the AUTO EDIT key and press the REC key. (You can rehearse automatic punch-in/out by pressing the PLAY key while holding down the AUTO EDIT key.)

Time code chase starts, while executing automatic punch-in/out.

Notes

- To execute automatic punch-in/out during time code chase, the PCM-9000 must synchronize with the external time code prior to the in point. Thus, operate the master unit such that the PCM-9000 starts playing back about 10 seconds prior to the in point.
- You cannot execute automatic punch-in/out in monitor recording mode. Press the REC MODE key on the PCM-9000, such that the SYNC indicator lights.

Chapter 7
Optimum Use of a Disc

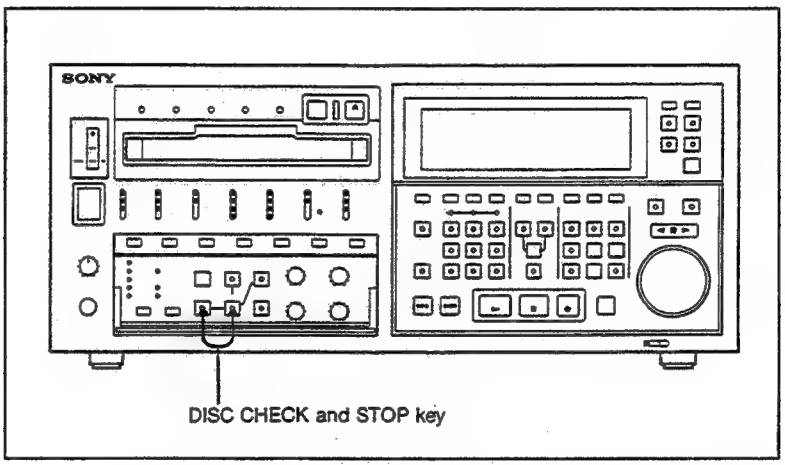
The PCM-9000 provides some disc utility functions. The disc check function, which can check whether there is anything wrong with a disc, the optimize function (with the optional DABK-9007 installed) deletes unnecessary audio data after program editing, and an instant/full erasing function are available. This chapter explains these functions.

7-1. Checking a Disc

Dust and stains may accumulate on discs after they have been used for a long period of time. To avoid data read/write errors, the PCM-9000 has a disc check function which verifies the condition of the disc. By executing this function, not only the audio data area, but also the edit data area are verified.

Checking a disc

Check a disc by following the procedure below.



Press the DISC CHECK key and STOP key simultaneously on the PCM-9000 while the unit is stopped.

The DISC CHECK key lights steadily, and checking starts.
"D-ch ON" appears in the display window.
Once the check has been completed, the DISC CHECK key goes out.
After that, the result appears in the display window.
If the disc is normal, "GOOD" appears.
If there is something wrong with the disc, "NEED CLEAN" appears.
See the next paragraph "When a disc error is detected".

Note
All keys, other than the STOP key, are disabled during disc checking.

Canceling disc checking

Press the STOP key.

Disc checking is canceled. To restart disc checking, repeat the procedure from the beginning.

When a disc error is detected

If a error is detected as a result of checking a disc, clean the disc. If, after cleaning the disc, the error is still detected, clean the lens of the PCM-9000.
For details of cleaning a disc, see "3-4-5. Cleaning a disc"
For details of cleaning the PCM-9000's lens , refer to the maintenance manual.

Check the disc again after cleaning the lens. If an error is still reported, discard the disc.

7-2. Optimum Use of a Disc

To make optimum use of the space on a disc, you can delete unnecessary data, or all of the data recorded on a disc. The former function, called optimizing, requires that the optional DABK-9007. For the latter function, there are two types: deleting management data recorded on a disc (instant erasing), and deleting all data recorded on a disc (full erasing).

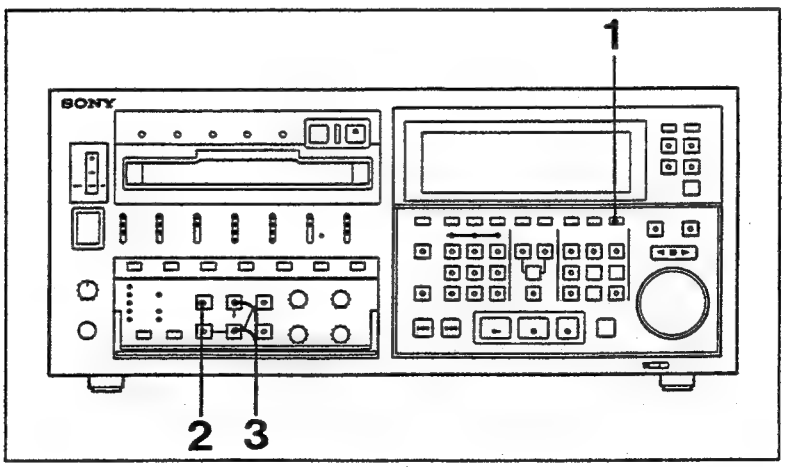
7-2-1. Deleting Unnecessary Data — Optimizing Function

You can delete the data recorded on a disc, except for certain tracks, or certain files (both the audio and edit data). When optimizing, tracks are re-recorded on the disc in order.
To execute this function, the optional DABK-9007 must be installed.

Note
After optimizing, the re-recorded section will have only one rec ID (rec ID number 1).

Deleting all data except tracks

You can automatically delete all audio and editing data, except for tracks, and re-record those tracks in the order in which they are registered. Data that is not registered as a track is deleted.



1 Press the OPR MODE key, such that the DISC indicator appears in the display window.

The unit enters disc operation mode.

2 Press the REC READY key on the PCM-9000.

3 While holding down the STOP key on the PCM-9000, press the OPTIMIZE key.

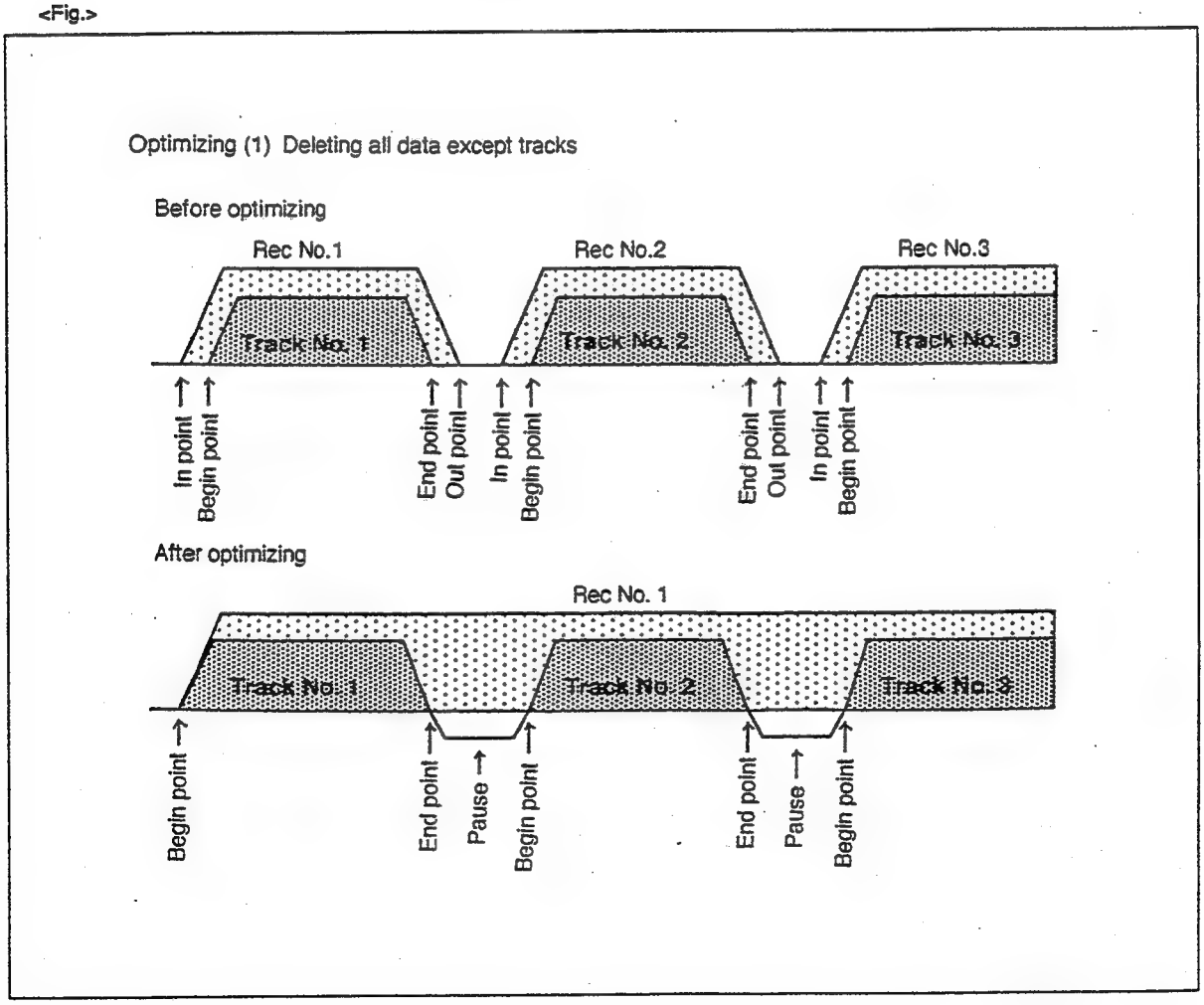
"OPT ON" appears in the display window, and optimizing starts.
After optimizing ends, the OPTIMIZE key indicator goes out.

Canceling optimizing

Press the STOP key.

Optimizing is canceled.
To resume optimizing, repeat the procedure from the beginning.

<Fig.>



Pause time (2 seconds) depend on your choice

7-2. Optimum Use of a Disc

Deleting all data except for one file

You can automatically delete all audio and editing data, except for one file and re-record the tracks contained in that file. All other data is deleted.

1 Press the OPR MODE key, such that the FILE indicator appears in the display window.

The unit enters file operation mode.

2 Rotate the search dial until the number of the file to be kept appears, or input the file number directly by using the 10 key unit.

The designated file number, and the numbers of the tracks contained in that file, appear in the display window.

3 Press the REC READY key on the PCM-9000.

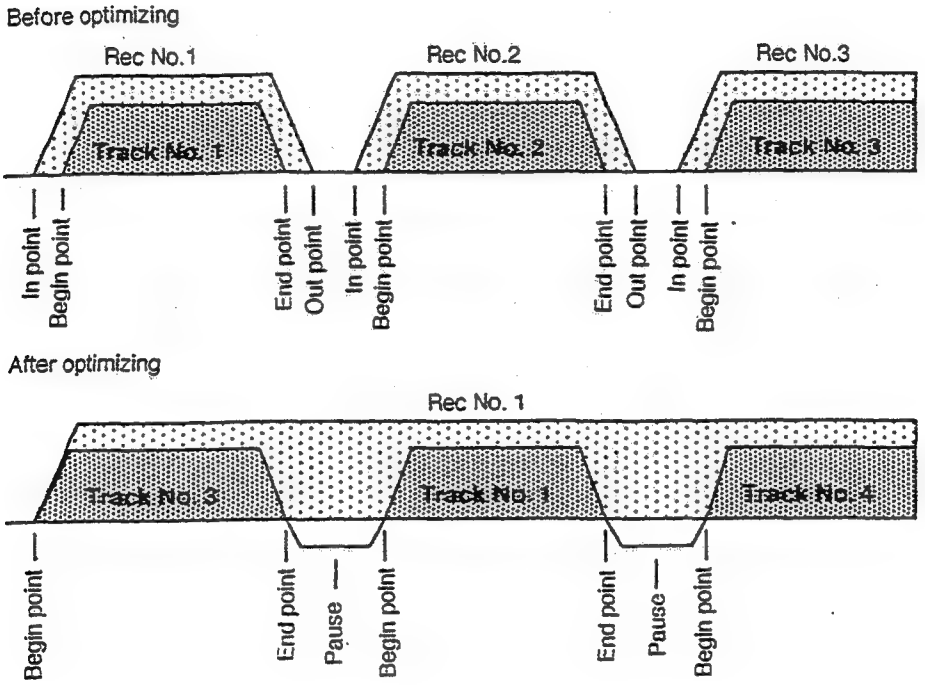
4 While holding down the STOP key on the PCM-9000, press the OPTIMIZE key.

"OPT ON" appears in the display window, and optimizing starts.
After optimizing finishes, the OPTIMIZE key indicator goes out.

Canceling optimizing

Press the STOP key.
Optimizing is canceled.
To resume optimizing, repeat the operation from the beginning.

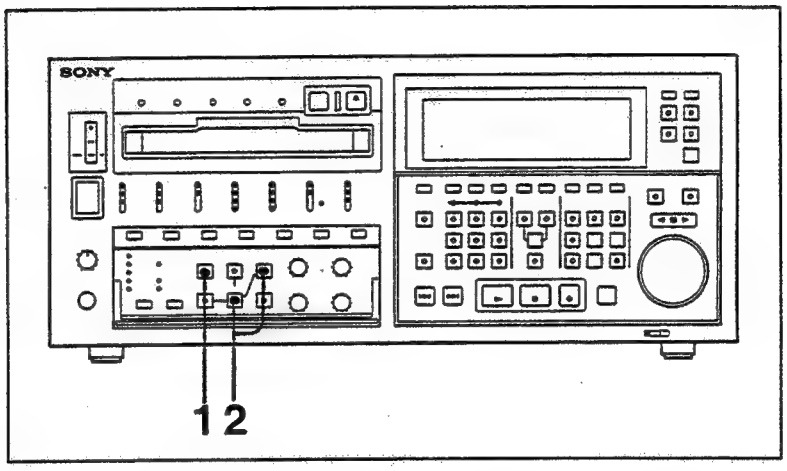
Optimizing (2) Deleting all data except for one file
Example: File number 5, consisting of track numbers 3, 1, 4, ...



7-2. Optimum Use of a Disc

7-2-2. Instant Erasing

By deleting the rec ID data,you can overwrite new audio and edit data on the disc.This function is used to re-use a previouslyrecorded disc.Note once you use this function, the edit data whose rec ID data has been deleted cannot be playedback.



1 Press the OPR MODE key,select the nomal operation mode.

2 Press the REC READY key on the PCM-9000.

3 While the PCM-9000 is stopped, hold down the STOP key and press the INSTANT ERASE on the PCM-9000.

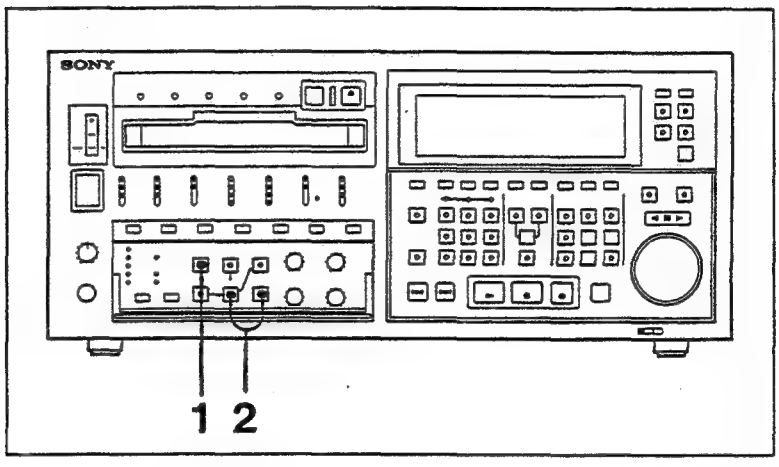
"ERASE ON" appears in the display window, and deleting starts.
Once deleting ends, the INSTANT ERASE key indicator goes out.

Note

Instant erasing takes less than one minute. You can cancel the instant erase by pressing STOP key.After that when you insert the same disc as you canceled the "instant erase",NEED ERASE appears in the display window. This disc can be used only after "instant erase" operation is completed. Be sure of your intentions before starting this procedure.

7-2-3. Full Erasing

You can initialize a previously used disc by deleting all data on that disc.



1 Press the OPR MODE key,select normal operation mode.

2 Press the REC READY key on the PCM-9000.

3 While the PCM-9000 is stopped, hold down the STOP key and press the DISC ERASE key.

"ERASE ON" appears in the display window, and deleting starts.
It takes about 20 minutes to delete all the data on a disc.
Once deleting ends, the DISC ERASE key indicator goes out.

Canceling deleting

Press the STOP key.

Deleting is canceled.

Note

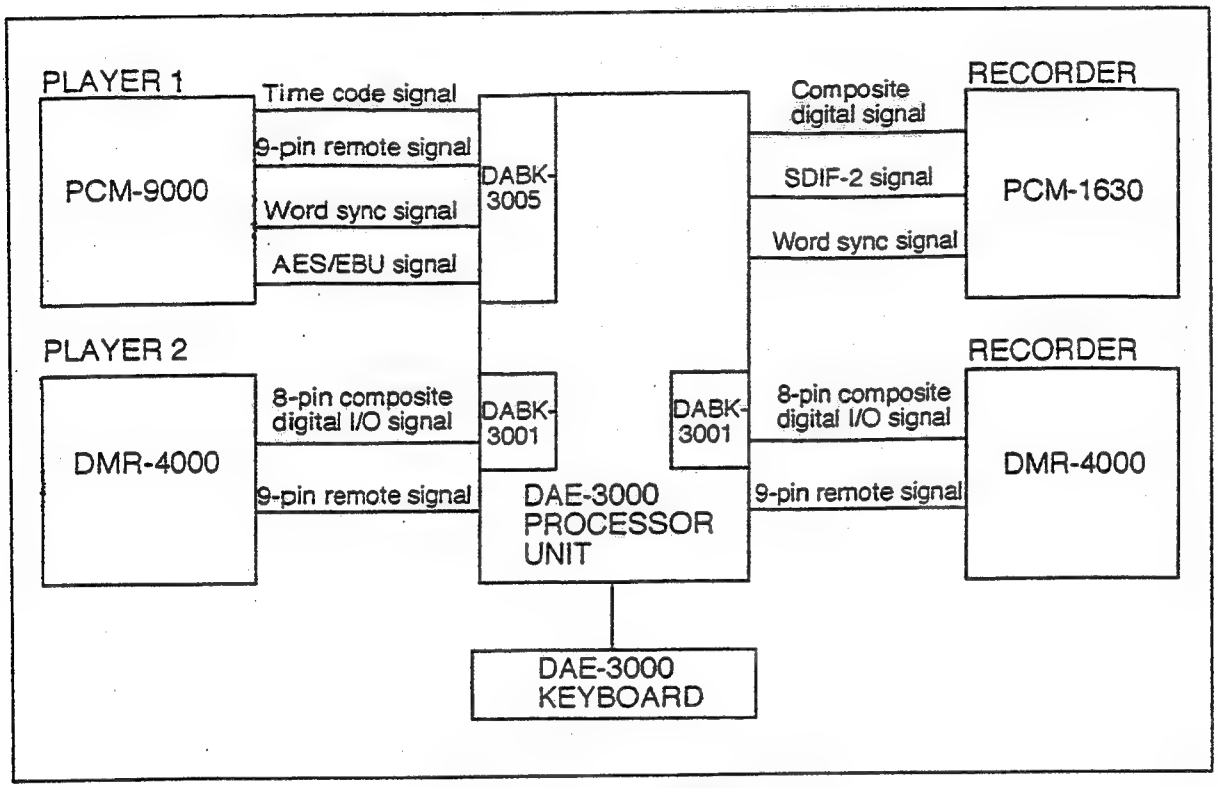
If a disc, for which an erase operation was not completed successfully, is inserted, "NEED ERASE" may appear in the display window.
In this case, complete the deletion by following the above procedure, or perform the "instant erase".

Chapter 8
Advanced System Configurations

This chapter explains the configuration of advanced systems. You can use this chapter as a system configuration reference.

8-1. Editing System with DAE-3000

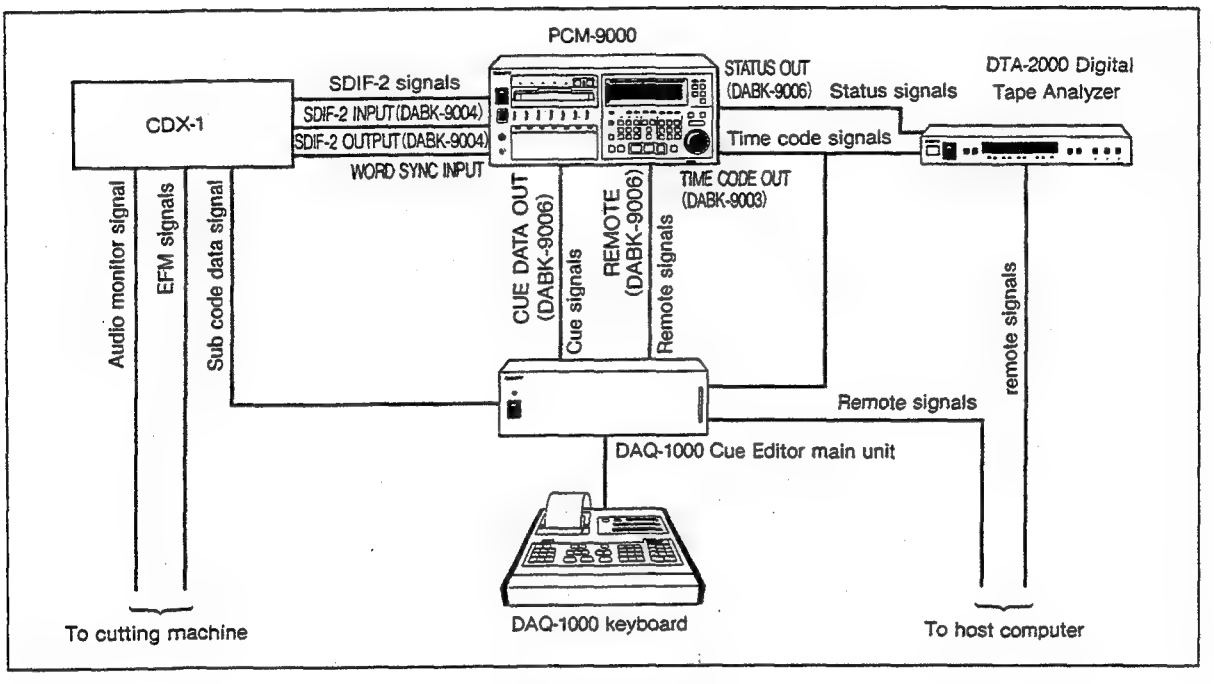
The figure below shows an example system controlled by the DAE-3000 Digital Audio Editor, using the PCM-9000 as the player.



Example system using the DAE-3000 as a controller

8-2. CD Cutting System

The figure below shows an example CD cutting system that uses the PCM-9000 as a master recorder.



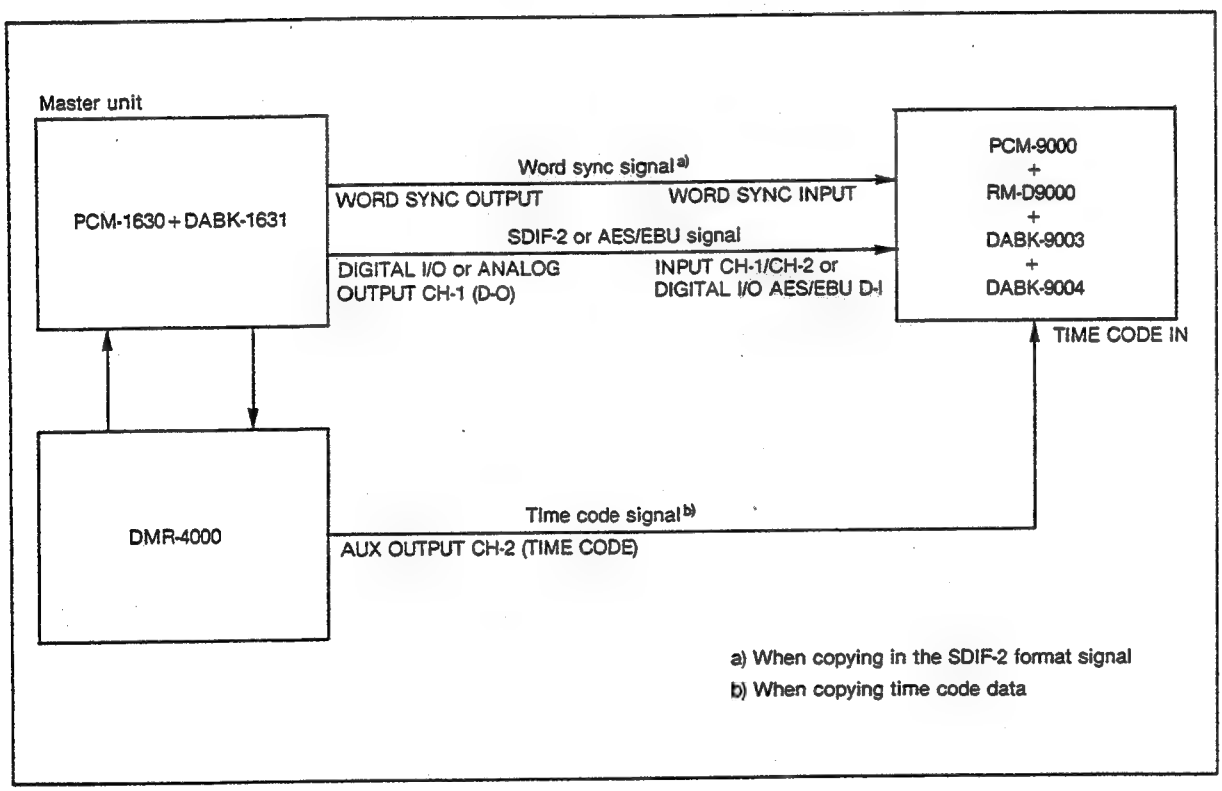
Example CD cutting system

8-3. Digital Copying between PCM-9000

The PCM-1630 system consists of the following equipment:
- PCM-1630 Digital Audio Processor
- DMR-4000 Digital Master Recorder
- DABK-1631 Digital I/O Option

Digital copying from the PCM-1630 system to the PCM-9000

You can make a CD master disc for by copying a master tape on the DMR-4000 to the PCM-9000.



Notes on copying from the PCM-1630 system to the PCM-9000

Set the following values:
- Sampling frequency (in system): 44.1 kHz.
- Time code format (in system): 30 (frame/s).
- To copy the PQ cue data on a master tape, the DABK-9006 must be installed to the PCM-9000.

When copying an the AES/EBU format signal
- SYNC CLOCK of the PCM-9000: D-I
- DIP switch 8 on the PCM-9000: II.

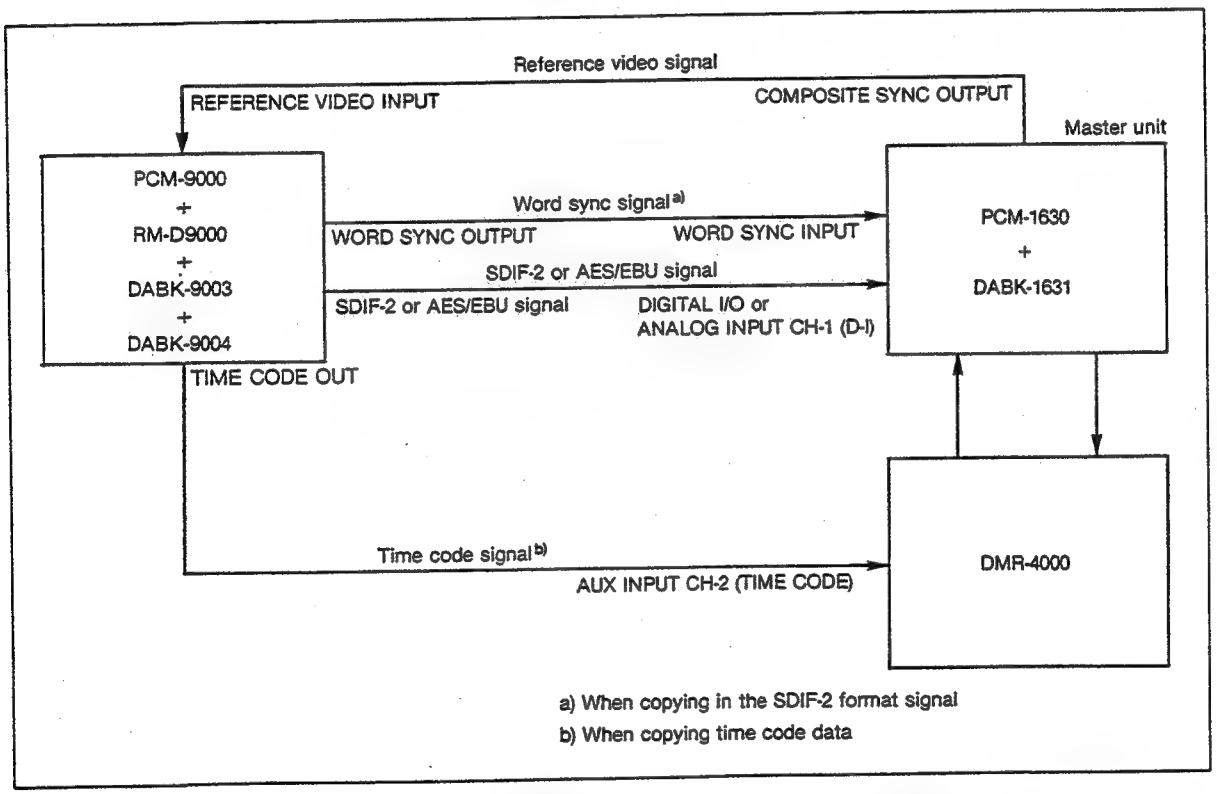
When copying an SDIF-2 format signal
SYNC CLOCK of the PCM-9000: EXT

Notes

- To copy the PQ cue on the master tape, the optional DABK-9006 must be installed.
- You can use the AES/EBU D-I signal as the external sync signal when copying an SDIF-2 format signal. Make settings as those for "When copying in the AES/EBU format signal", above.

Digital copying from the PCM-9000 to the PCM-1630 system

You can produce a CD by using a master disc recorded on the PCM-9000.



Notes on copying from the PCM-9000 to the PCM-1630 system

Set the following values:
Make the PCM-1630 system the master unit for system synchronization.

- Sampling frequency (in system): 44.1 kHz
- Time code format (in system): 30 (frame/s)
- SYNC CLOCK of the PCM-9000: VIDEO

8-3. Digital Copying between PCM-9000

When copying time code data together with audio data

(1) Press the FORMAT key of the PCM-9000, such that 30 indicator lights.

(2) Set the time code format of the DMR-4000 to non-drop frame mode (NDF).

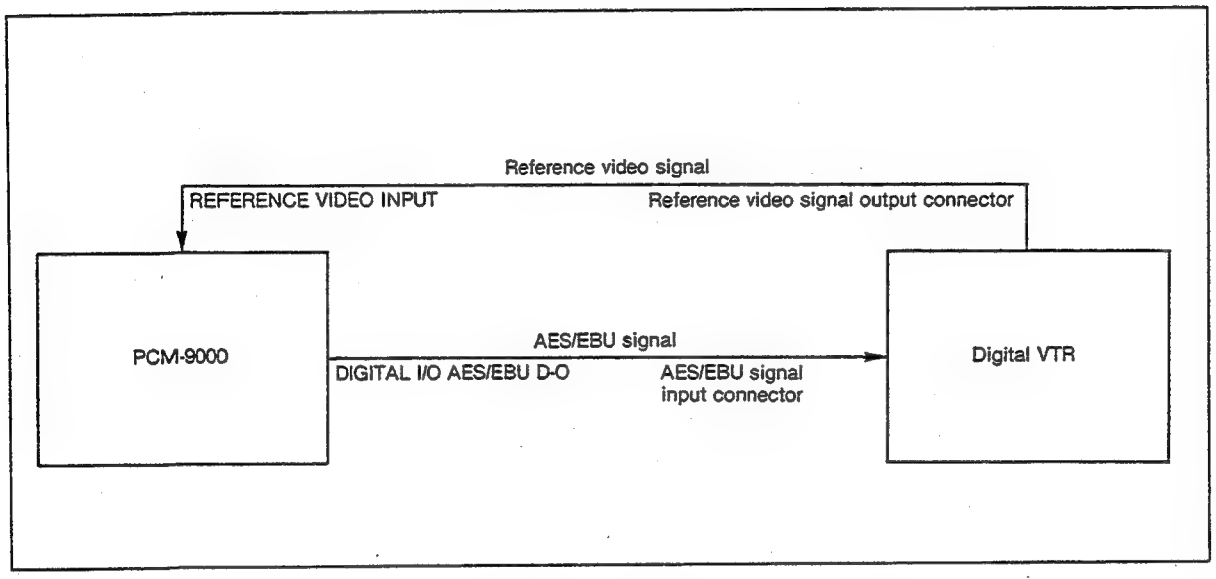
(3) Start the time code sync playback on the PCM-9000 by pressing the PLAY key.
For details of time code sync playback, see "4-3-3. Time Code Sync Playback".

(4) After starting playback on the PCM-9000, start recording on the DMR-4000.

Notes
- You cannot copy to the PCM-1630 system if you select a system sampling frequency other than 44.1 kHz.
- While copying, you must execute time code sync playback. Otherwise, time code data may be recorded incorrectly.
- You cannot execute digital copy while executing variable speed playback on the PCM-9000. In this case, copy the analog signal.

8-4. Digital Copying to Digital VTR

You can copy audio data recorded on the master disc to a digital VTR in AES/EBU digital audio format.



Notes on copying to a digital VTR

Set the following values:

- Make the digital VTR the master unit for system synchronization.
- Connect the composite sync (reference video) signal to the PCM-9000 and the digital VTR.
- Sampling frequency: 48 kHz
- YNC CLOCK of the PCM-9000: VIDEO

Appendixes

Specifications

General

Dimensions	423 × 177 × 455 mm (16 3/4 × 7 × 17 3/4 inches) (w/h/d)(excluding projections)
Mass	17 kg (37 lb 8 oz)
Power requirements	100 to 240 V AC, 50/60 Hz
Power consumption	130 W, 2.4 -0.5 A
Operating temperature	10°C to 35°C
Operating humidity	30% to 70% (to guarantee performance specification) 20 % to 80 % (to guarantee operation)
Storage temperature	-20 C to +55 C
Storage humidity	20 % to 75 %
Slant Operation	-7° to +7° (to guarantee performance specification) -10° to -10° (to guarantee operation)

Format

Recording Format	MS disc format
Number of digital audio channels	2
Quantization	16-, 20-, 24-bit
Error correction	Sony super strategy cross interleave Reed Solomon Code (CIRC)
Recording time	80 minutes (20-bit, Fs=44.1 kHz)
Disc speed variation range	±12.5%
Disc used	MO (Magneto-Optical) disc

Audio characteristics (with optional DABK-9001)

Frequency response	20 Hz to 20 kHz ±0.5 dB (Fs=48 kHz)
Dynamic range	104 dB typical (emphasis off, with optional DABK-9001)
Total harmonic distortion	0.03% maximum
Sampling frequency	44.056 kHz, 44.1 kHz, 48 kHz
Signal processing system delay time	66.712 ms maximum

Signal processing system delay time
66.712 ms maximum
(16-bit, Fs=44.056 kHz)
Delay time of A/D, D/A
1.8 mS (with optional DABK-9001)

Input/Output connectors

PCM-9000

REFERENCE VIDEO connectors
Format: NTSC/PAL/SECAM composite video, or rectangular wave
Levels: 0.3 Vp-p (Burst signal),
4.0 Vp-p (Composite sync signal)
0.3 to 5 Vp-p (rectangular wave)
Impedance: 75 ohm, unbalanced
Connector: BNC type (2), loop-through
WORD SYNC INPUT connectors
Format: 50% duty, with rectangular pulse leading edge
Level: TTL compatible
Input level: 3 V0p minimum
Impedance: 75 ohm, unbalanced
Connector: BNC type (2), loop-through
WORD SYNC OUTPUT connectors
Format: 50% duty, with rectangular pulse leading edge
Level TTL compatible
Output level: 3V or more
Impedance: 75 ohm, unbalanced
Connector: BNC type (2)
D-I SYNC connector
Format: AES 3-1992
Level: RS-422A
Impedance: 110 ohm
Connector: XLR-3-31 (1)
INSERTION RETURN connector
ormat: AES 3-1992
Impedance: 110 ohm
Transfer rate: 3.840 Mbit/s (20-bit, Fs=48 kHz)
3.072 Mbit/s (16-bit, Fs=48 kHz)
Connector: XLR-3-31 (1)
INSERTION SEND connector
Format: AES 3-1992
Connector: XLR-3-32 (1)
DIGITAL I/O AES/EBU D-I connector
Format: AES 3-1992
Impedance: 110 ohm
Connector: XLR-3-31 (1)
DIGITAL I/O AES/EBU D-O connector

Format: AES 3-1992
Connector: XLR-3-32
REMOTE connector
Format: Serial
Level: RS-422A
Connector: Round type 10-pin, female (1)

DABK-9005 Interface Board (SCSI)

SCSI connector
Format: SCSI
Connector: Half-pitch amphenol 50-pin (2)

DABK-9006 Interface Board (DAQ)

CUE DATA IN connector
Format: FM
Level: 1.2 to 10 Vp-p (10 kohm)
Transfer rate: 4800 bits/s
Connector: XLR-3-31 (1)
CUE DATA OUT connector
Format: FM
Level: 2.4 +-0.5 Vp-p (10 kohm load)
Transfer rate: 4800 bits/s
Connector: XLR-3-32 (1)
REMOTE connector
Format: Parallel
Level: TTL compatible
Connector: Amphenol 36-pin (1)
STATUS OUT connector
Format: Parallel
Level: TTL compatible
Connector: D-SUB 25-pin (1)

DABK-9003 Interface Board (Time code/Remote)

TIME CODE IN connector
Format: IEC 461 (SMPTE/EBU)
Level: 0.5 to 10 Vp-p (10 kohm, balanced)
Connector: XLR-3-31 (1)
TIME CODE OUT connector
Format: IEC 461 (SMPTE/EBU)
Level: 2.4+-0.1 Vp-p (100 ohm or less, balanced)
Connector: XLR-3-32 (1)
PARALLEL REMOTE connector
Format: Parallel
Level: TTL compatible
Connector: D-SUB 50-pin (1)
REMOTE (9PIN) connector
Format: Sony 9-pin
Level: RS-422A
Connector: D-SUB 9-pin

DABK-9004 Digital I/O Board (SDIF-2)

INPUT CH-1, CH-2 connector
- Format: SDIF-2, unbalanced
- Level: TTL compatible
- Transfer rate: 1.536 Mbit/s (16-bit, Fs=48 kHz)
- Connector: BNC type (2)

OUTPUT CH-1, CH-2 connectors
- Format: SDIF-2, unbalanced
- Level: TTL compatible
- Connector: BNC type (2)

DABK-9001 Converter Board (20-bit A/D, D/A)

LINE INPUT CH-1, CH-2 connectors
- Reference level: +4 dBs
- Maximum Level: +26 dBs
- Impedance: 20 kohm/600 ohm, balanced/unbalanced
- Connector: XLR-3-31 (2)

LINE OUTPUT CH-1, CH-2 connectors
- Reference level: +4 dBs
- Maximum Level: +26 dBs
- Impedance: Less than 60 ohm, balanced/unbalanced
- Connector: XLR-3-32 (2)

Accessories supplied

Power cord	(1)
Operation manual	(1)
Maintenance manual	(1)
Blanc panel	(1)
Plug holder	(1)
Ball point L wrench BL2MM	(1)
Rack angle assembly	(2)
Screw (B4 × 16)	(4)
Screw (RK5 × 16)	(4)
Trapezoid ornamental washer (o5)	(4)

Optional accessories

DABK-900	Converter Board (20-bit A/D, D/A)
DABK-9003	Interface Board (Time code/Remote)
DABK-9004	Digital I/O Board (SDIF-2)
DABK-9005	Interface Board (SCSI)
DABK-9006	Interface Board (DAQ)
DABK-9007	Memory Board
MOA-D51	Disc Cleaning Kit
MSD-1200	Digital Audio Master Disc
AC-E6AM JE3	AC PowerAdopter(for RM-D9000)

Design and specification are subject to change without notice.

Glossary

AAIP
The signal read from the pre-groove on an MO disc contains address information (AAIP: Absolute Address In Pre-groove). The time code obtained by converting this address is called the disc time code. The disc time code format (NTSC/PAL, DF/NDF, etc.) can be set with a switch on the PCM-9000. By using AAIP, you need not perform prestriping (recording of an external time code) for a new disc, a process that is normally necessary when using tape-based media.

Audio data
One of the digital signals recorded onto an MO disc, and which represents audio information. Besides the audio signal, the PCM-9000 also records edit data that defines the record point and edit point for audio data, etc. onto the MO disc.

Edit data
One of the digital signals recorded onto an MO disc. This signal provides information about the editing of audio signals. Edit data includes information about the begin/end points of tracks, and files (groups of tracks), and so on. The master disc recorder system allows you to edit audio simply by making or modifying edit data without re-recording the audio signals them selves.

EXT TC (External time code)
A time code input from external equipment together with audio data, and recorded onto an MO disc. It corresponds to the conventional time code recorded onto tape-based media. With the PCM-9000 system, you can use the AAIP on a disc, so normally you do not have to record an external time code. Instead, the EXT TC is usually used to record time codes and audio signals that are played back by equipment that is not synchronized with the reference video signal.

File
The unit used to handle and save a group of tracks (the smallest unit for a series of audio data) arranged in order of playback. A file contains edit data such as track addresses, playback order, and so on.

MO (Magneto-Optical) disc
An removable storage device that utilizes the polarization of a laser beam applied to the surface of a magnetic medium. To write data, the surface of the magnetic medium is heated with a strong laser beam, then the polarity of the magnetic medium is changed by a magnetic field. Data is read by applying a weak laser beam to the magnetized surface, then detecting the polarization of the reflected beam.

Optimizing
The process of deleting audio data that is not registered as part of a track, or that which is not specified as being part of a file, among the digital signals recorded on an MO disc. After optimization, the tracks in the specified file are rerecorded in the order in which they were registered.

Pause
A duration of no sound that can be inserted between two tracks.

Program
A group of tracks (the smallest unit of audio data) arranged in the order in which they will be played back. You can save a registered program on a disc as a file.

Program copy
Copying a specified program file (a group of tracks) to the MO disc on another PCM-9000. The audio and edit data is copied at about twice normal playback speed, through the SCSI (Small Computer System Interface).

SCSI (Small Computer System Interface)
A general-purpose interface for computer peripherals, formulated by ANSI (American National Standards Institute). It enables the daisy chain connection of up to eight units, such as a hard disc, a CD-ROM drive, and a magneto-optical disc drive.

Time code offset

The time value used to shift disc time code addresses, converted from the block addresses pre-grooved on an MO disc, to a desired value. The time code address at the top of a disc is initially 00 hour 00 minute 00 second 00 frame, but you can specify any value for this address by changing the offset.

Track

A unit that determines the sequence of audio data. A track is determined by specifying two points (begin and end points) in the audio data recorded on a disc. A number of tracks can be arranged in the order in which they are to be played back, and saved as a file.

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